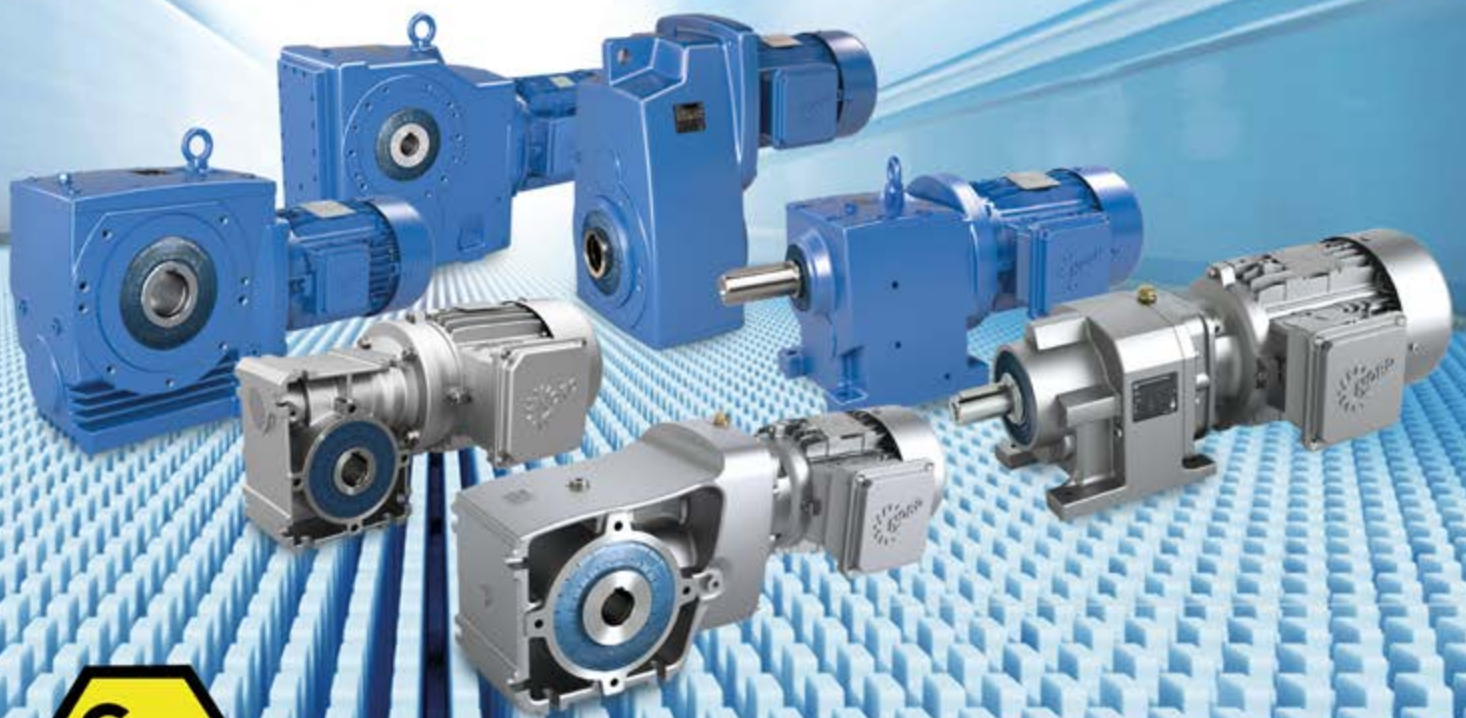


Intelligent Drivesystems, Worldwide Services



ATEX

EN

B 2000

Explosion-protected gear units

Operating and Assembly Instructions





General safety and operating instructions

1. General

Depending on its protection class, the device may have live, bare, moving or rotating parts or hot surfaces during operation.

Unauthorised removal of covers, improper use, incorrect installation or operation causes a risk of serious personal injury or material damage.

All transport, installation, commissioning and maintenance work must be carried out by qualified specialist personnel (national accident prevention regulations must be observed).

Within the meaning of this basic safety information, qualified specialist personnel are persons who are familiar with the installation, assembly, commissioning and operation of the product and who have the training and experience to recognise and avoid any hazards and risks.

2. Correct use

NORD products may only be used according to the information in the catalogue and the associated technical documentation.

Compliance with the operating and installation instructions is a **prerequisite for fault-free operation** and for the fulfilment of any warranty claims. **These operating and installation instructions must be read** before working with the device!

These operating and installation instructions contain important information about **servicing**. They must therefore be kept **close to the device**.

All details regarding technical data and permissible conditions at the installation site must be complied with.

3. Transport, storage

Information regarding transport, storage and correct handling must be complied with.

4. Installation

The device must be protected against impermissible loads. In particular, during transport and handling, components must not be deformed or changed. Touching of electronic components and contacts must be avoided.

5. Electrical Connection

When working on live three-phase motors, the applicable national accident prevention regulations must be complied with (e.g. BGV A3, formerly VBG 4).

The electrical installation must be implemented according to the applicable regulations (e.g. cable cross-section, fuses, earth lead connections).

Information regarding EMC-compliant installation – such as shielding, earthing and installation of cables – can be found in the three-phase motor documentation. Compliance with the limiting values specified in the EMC regulations is the responsibility of the manufacturer of the system or machine.

6. Operation

Appropriate safety measures must be taken for applications where failure of the device may result in injury.

Where necessary, systems in which NORD devices are installed must be equipped with additional monitoring and protective equipment according to the applicable safety requirements, e.g. legislation concerning technical equipment, accident prevention regulations, etc.

All covers and guards must be kept closed during operation.

7. Maintenance and repairs

After the device has been disconnected from the power supply, live equipment components and power connections should not be touched immediately, because of possible charged capacitors.

Further information can be found in this documentation.

These safety instructions must be kept in a safe place!

Documentation

Name: **B 2000**
 Part No.: **6051402**
 Series: Gear units and geared motors
 Type series:
 Gear unit types: **Helical gear units**
 NORDBLOC helical gear units
 Standard helical gear units
 Parallel shaft gear units
 Bevel gear units
 Helical worm gear units
 MINIBLOC worm gear units
 UNIVERSAL worm gear units

Version list

Title, Date	Order number	Comments
B 2000 , January 2013	6051402 / 0413	-
B 2000 , September 2014	6051402 / 3814	General corrections
B 2000 , April 2015	6051402 / 1915	New gear unit types SK 10382.1 + SK 11382.1
B 2000 , March 2016	6051402 / 0916	General corrections Adaptation of new ATEX Directives as of 20.04.2016

Table 1: Version list B 2000

Copyright notice

As an integral component of the device described here, this document must be provided to all users in a suitable form.
 Any editing or amendment or other utilisation of the document is prohibited.

Publisher

Getriebebau NORD GmbH & Co. KG
 Getriebebau-Nord-Straße 1 • 22941 Bargteheide, Germany • <http://www.nord.com/>
 Fon +49 (0) 45 32 / 289-0 • Fax +49 (0) 45 32 / 289-2253

Table of Contents

1	Notes	8
1.1	General information.....	8
1.2	Safety and information symbols	9
1.2.1	Explanation of designations used	9
1.3	Correct use	9
1.4	Safety information	10
1.5	Other documents	12
1.6	Disposal	12
2	Description of gear unit	13
2.1	Type designations and gear unit types	13
3	Assembly instructions, storage, preparation, installation	19
3.1	Transporting the gear unit	19
3.2	Storage	20
3.3	Long-term storage	20
3.4	Inspecting the drive unit	22
3.5	Checking the type plate data.....	22
3.6	Checking the configuration.....	24
3.7	Preparing for installation	25
3.8	Installing the gear unit	26
3.9	Fitting hubs on the gear shafts	27
3.10	Fitting push-on gear units.....	30
3.11	Fitting shrink discs	33
3.12	Fitting the covers.....	35
3.13	Fitting a standard motor	36
3.14	Fitting the cooling coil to the cooling system	38
3.15	Temperature sticker	39
3.16	Installation example for an SCX flange	40
3.17	Installation of an oil expansion tank, Option OA.....	40
4	Commissioning	41
4.1	Check the oil level	41
4.2	Activating the Automatic Lubricant Dispenser.....	43
4.3	Temperature measurement.....	44
4.4	Operation with lubricant cooling	45
4.5	Checking the gear unit	46
4.6	Checklist	47
4.7	Operation of the gear unit in explosive areas.....	48
5	Service and maintenance	49
5.1	Service and Maintenance Intervals	49
5.2	Service and Maintenance Work	50
6	Appendix	60
6.1	Configurations and maintenance	60
6.2	Lubricants	75
6.3	Torque values	76
6.4	Troubleshooting	77
6.5	Leaks and seals	78
6.6	Declaration of Conformity.....	79
6.6.1	Explosion protected gear units and geared motors, Category 3G and 3D.....	79
6.6.2	Explosion protected gear units and geared motors, Category 3G and 3D.....	80
6.7	Repair information.....	81
6.7.1	Repairs	81
6.7.2	Internet information.....	81
6.8	Abbreviations	81

List of illustrations

Fig. 1: Type plate (example)	22
Figure 2: Activation of the pressure vent	26
Figure 3: Example of a simple pulling device	28
Figure 4: Permissible application of force to drive and driven shafts	29
Figure 5: Applying lubricant to the shaft and the hub	30
Figure 6: Removing the factory-fitted closing cap	31
Figure 7: Gear unit mounted to shaft with a shoulder using the fastening element	31
Figure 8: Gear unit mounted to shaft without a shoulder using the fastening element	31
Figure 9: Dismantling using dismantling device	31
Figure 10: Mounting the rubber buffer (Option G and/or VG) on parallel shaft gear units	32
Fig. 11: Attaching the torque support on bevel gear and worm gear units	32
Figure 12: Hollow shaft with shrink disc	33
Figure 13: Fitting the covers, Option SH, Option H, and Option H66	35
Figure 14: Fitting the coupling onto the motor shaft - various types of coupling	37
Figure 15: Cooling cover	38
Fig. 16: Position of the temperature sticker	39
Fig. 17: Installation example for an SCX flange	40
Fig. 19: Checking the oil level with a dipstick	42
Fig. 20: Activating the automatic lubricant dispenser with standard motor mounting	43
Fig. 21: Adhesive label	43
Fig. 22: ATEX labelling	45
Fig. 23: Temperature sticker	45
Fig. 24: Measurement of gear rim wearing on the ROTEX claw coupling®	53
Fig. 25: Measurement of gear sleeve wear for gear BoWex couplings®	54
Fig. 26: Replacing the automatic lubricant dispenser with standard motor mounting	55
Figure 27: Parallel shaft gear units with oil level tank	60
Figure 28: Bring the gear unit into the M2 installation orientation	61
Fig. 29: Measuring the oil level	62
Fig. 30: Orientation for oil level check	62
Fig. 31: Declaration of Conformity for Category 2G / 2D	79
Fig. 32: Declaration of Conformity for Category 3G / 3D	80

List of tables

Table 1: Version list B 2000.....	3
Table 2: Disposal of materials	12
Table 3: Helical gear units - Type designation and gear unit types	13
Table 4: Large helical gear units - Type designation and gear unit types.....	13
Table 5: NORDBLOC helical gear units - Type designation and gear unit types.....	14
Table 6: NORDBLOC helical gear units - Type designation and gear unit types.....	14
Table 7: Parallel shaft gear units - Type designation and gear unit types	15
Table 8: Bevel gear units - Type designation and gear unit types	16
Table 9: Helical worm gear units - Type designation and gear unit types.....	17
Table 10: MINIBLOC - Type designation and gear unit types	17
Table 11: UNIVERSAL worm gear units - Type designation and gear unit types	18
Table 12: Limiting wear values for coupling gear rims	54
Table 13: Oil fill quantities for standard helical gear units for ATEX category 3G and 3D	57
Table 14: Lubricant table	75
Table 15: Torque values	76
Table 16: Overview of malfunctions.....	77
Table 17: Definition of leaks according to DIN 3761.....	78

1 Notes

1.1 General information

Read the Operating Manual carefully prior to performing any work on or putting the gear unit into operation. Strict compliance with the instructions in this Operating Manual is essential. This Operating Manual and all associated special documentation must be kept in the immediate vicinity of the gear unit.

Getriebebau NORD accepts no liability for damage to persons, materials or assets as a result of the non-observance of this Operating Manual, operating errors or incorrect use. General wearing parts, e.g. radial seals are excluded from the warranty.







If additional components are attached to or installed on or in the gear unit (e.g. motor, cooling system, pressure sensor etc.) or components (e.g. cooling system) are supplied with the order, the operating instructions for these components must be observed.

If geared motors are used, compliance with the Motor Operating Manual is also necessary.

If you do not understand the contents of this Operating Manual or additional operating instructions, please consult Getriebebau NORD!

1.2 Safety and information symbols


1.2.1 Explanation of designations used

 DANGER!	<p>Indicates an immediate danger, which may result in death or serious injury.</p>
 DANGER! 	<p>Indicates an immediate danger, which may result in death or serious injury. Contains important information regarding explosion protection.</p>
 WARNING	<p>Indicates a possibly dangerous situation, which may result in death or serious injury.</p>
 CAUTION	<p>Indicates a possibly dangerous situation, which may result in slight or minor injuries.</p>
<p>NOTICE</p>	<p>Indicates a possibly harmful situation, which may cause damage to the product or the environment.</p>
 Information	<p>Indicates hints for use and useful information.</p>

1.3 Correct use

These gear units generate a rotational movement and are intended for use in commercial systems. They satisfy the explosion-protection requirements of Directive 94/9EC (ATEX100a) for the product category indicated on the type plate.

Commissioning (start of proper operation) is prohibited until it has been established that the machine complies with the local laws and directives. The EMC Directive 2004/108/EC and the Machinery Directive 2006/42/EC in their currently valid scope of application must be complied with in particular.

 WARNING	<p style="text-align: center;">Danger to persons</p>
<p>Appropriate safety measures must be taken for applications where failure of a gear unit or geared motor may result in injury.</p> <p>Safeguard a wide area around the hazard zone.</p>	

! WARNING
Explosion hazard


Only components which comply with the applicable regulations of Directive 94/9/EU may be fitted and operated.

Observe the Declaration of Conformity and all safety information for the components.

! WARNING
Material damage and personal injury

If the gear unit is not used as designed, this may cause damage to the gear unit or the premature failure of components. Personal injury as a result of this cannot be ruled out.

Strict compliance with the technical data on the type plate is essential. The documentation must be observed.

1.4 Safety information

Observe all safety information, including that provided in the individual sections of this Operating Manual. All national and other regulations on safety and accident prevention must also be observed.

! DANGER!
Explosion hazard


Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.

! DANGER!
Severe personal injury

Serious physical and property damage may result from inappropriate installation, non-designated use, incorrect operation, non-compliance with safety information, unauthorised removal of housing components or safety covers and structural modifications to the gear unit.

- All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing, maintenance and repair must only be performed by qualified specialist personnel.
- Observe the Operating Manual.
- Observe the safety information.
- Observe the safety and accident prevention regulations.
- Tighten the driven elements or secure the parallel key before switching on.
- Do not make any structural modifications.
- Do not remove any safety devices.
- If necessary, wear hearing protection when working in the immediate vicinity of the gear unit.
- All rotating components must be provided with guards. In standard cases, covers are fitted by NORD. The covers must always be used if contact protection is not provided by other methods.

 **DANGER!**

Severe personal injury

The surfaces of gear units or geared motors may become hot during or shortly after operation.

- Installation and maintenance work must only be performed when gear unit is at a standstill and has cooled down. The drive must be isolated and secured to prevent accidental start-up.
- Wear protective gloves.
- Shield hot surfaces with contact guards.
- Do not store inflammable objects or substances in the immediate vicinity of the gear unit.

 **WARNING**

Serious personal injury and material damage

Serious injury and material damage due to improper transport are possible.

- No additional loads may be attached.
- Transportation aids and lifting gear must have an adequate load-bearing capacity.
- Pipes and hoses must be protected from damage.

 **CAUTION**

Cutting hazard

Danger of cuts from exterior edges of attachment adapters, flanges and covers.

Contact freezing with metallic components in case of low temperatures.

In addition to personal protective equipment, wear suitable protective gloves and suitable goggles during assembly, commissioning, inspection and maintenance, in order to prevent injuries.

It is recommended that repairs to NORD Products are carried out by the NORD Service department.

1.5 Other documents

Further information may be obtained from the following documents:

- Gear unit catalogues (G1000, G1012, G1014, G1035, G1050, G2000),
- Operating and maintenance instructions for the electric motor,
- if applicable, the Operating Manuals for attached or supplied options

1.6 Disposal

Observe the current local regulations. In particular, lubricants must be collected and disposed of correctly.

Gear unit components	Material
Gear wheels, shafts, rolling bearings, parallel keys, locking rings, ...	Steel
Gear unit housing, housing components, ...	Grey cast iron
Light alloy gear unit housing, light alloy gear unit housing components, ...	Aluminium
Worm gears, bushes, ...	Bronze
Radial seals, sealing caps, rubber components,...	Elastomers with steel
Coupling components	Plastic with steel
Flat seals	Asbestos-free sealing material
Gear oil	Additive mineral oil
Synthetic gear oil (type plate code: CLP PG)	Polyglycol-based lubricants
Cooling spiral, embedding material of the cooling spiral, screw fittings	Copper, epoxy, yellow brass

Table 2: Disposal of materials

2 Description of gear unit

2.1 Type designations and gear unit types

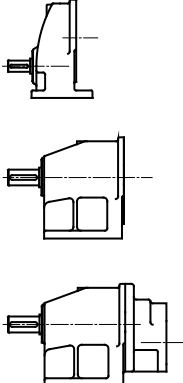
Gear unit types / Type designations	
Helical gear units SK 11E, SK 21E, ... SK 51E (1-stage) SK 02, SK 12, ... SK 52, SK 62N (2-stage) SK 03, SK 13, SK 23, SK 33N, SK 43, SK 53 (3-stage)	
	
Versions / Options	
-	Foot-mounted version
F	Output flange B5
XZ	Base and output flange B14
XF	Base and output flange B5
VL	Reinforced bearings
AL	Solid shaft, reinforced axial bearings
IEC	Standard IEC motor mounting
NEMA	Standard NEMA motor attachment
W	Free input shaft
VI	Viton radial seals
OA	Oil expansion tank
SO1	Synthetic oil ISO VG 220

Table 3: Helical gear units - Type designation and gear unit types

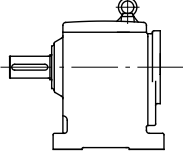
Gear unit types / Type designations	
Helical gear units SK 62, SK 72, SK 82, SK 92, SK 102 (2-stage) SK 63, SK 73, SK 83, SK 93, SK 103 (3-stage)	
	
Versions / Options	
-	Foot-mounted version
F	Output flange B5
XZ	Base and output flange B14
XF	Base and output flange B5
VL	Reinforced bearings
IEC	Standard IEC motor mounting
NEMA	Standard NEMA motor attachment
W	Free input shaft
VI	Viton radial seals
OA	Oil expansion tank
SO1	Synthetic oil ISO VG 220

Table 4: Large helical gear units - Type designation and gear unit types

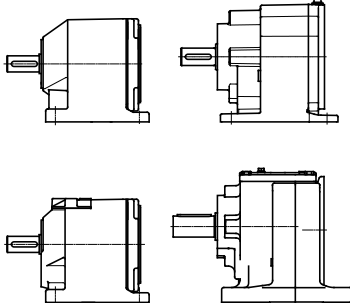
Gear unit types / Type designations	
NORDBLOC helical gear units	
SK 320, SK 172, SK 272, SK 972 (2-stage) SK 273, SK 373, SK 973 (3-stage) SK 072.1, SK 172.1 (2-stage) SK 372.1, SK 672.1 (2-stage) SK 373.1, SK 673.1 (3-stage) SK 772.1, SK 872.1, SK 972.1 (2-stage) SK 773.1, SK 873.1, SK 973.1 (3-stage)	
	
Versions / Options	
-	Foot-mounted version
F	Output flange B5
XZ	Base and output flange B14
XF	Base and output flange B5
VL	Reinforced bearings
IEC	Standard IEC motor mounting
NEMA	Standard NEMA motor attachment
W	Free input shaft
VI	Viton radial seals
OA	Oil expansion tank
SO1	Synthetic oil ISO VG 220

Table 5: NORDBLOC helical gear units - Type designation and gear unit types

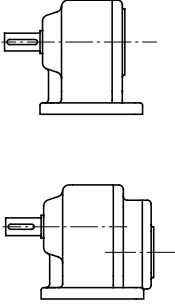
Gear unit types / Type designations	
Standard helical gear units	
SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage) SK 000, SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)	
	
Versions / Options	
-	Foot-mounted version
Z	Output flange B14
XZ	Base and output flange B14
XF	Base and output flange B5
F	Output flange B5
5	Reinforced output shaft
V	Reinforced drive
AL	Solid shaft, reinforced axial bearings
IEC	Standard IEC motor mounting
NEMA	Standard NEMA motor attachment
W	Free input shaft
VI	Viton radial seals
SO1	Synthetic oil ISO VG 220

Table 6: NORDBLOC helical gear units - Type designation and gear unit types

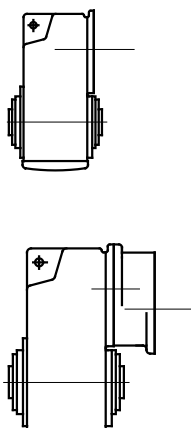
Gear unit types / Type designations			
<p>Parallel shaft gear units</p> <p>SK 0182NB, SK 0282NB, SK 1282, SK 9282, SK 10282, SK 11282 (2-stage) SK 1382NB, SK 2382, SK 9382, SK 10382, SK 11382, SK 12382 (3-stage) SK 10382.1, SK 11382.1</p>			
			
Versions / Options			
A	Hollow shaft version	VL	Reinforced bearings
V	Solid shaft version	VLII	Agitator version
Z	Output flange B14	VLIII	Drywell agitator version
F	Output flange B5	SCX	Screw Conveyor Flange
X	Foot mounting	IEC	Standard IEC motor mounting
S	Shrink disc	NEMA	Standard NEMA motor attachment
VS	Reinforced shrink disc	W	Free input shaft
EA	Hollow shaft with internal spline	VI	Viton radial seals
G	Rubber buffer	OA	Oil expansion tank
VG	Reinforced rubber buffer	SO1	Synthetic oil ISO VG 220
B	Fastening element	CC	Casing cover with cooling spiral
H	Covering cap as contact guard	OT	Oil level tank
H66	Covering cap IP66		

Table 7: Parallel shaft gear units - Type designation and gear unit types

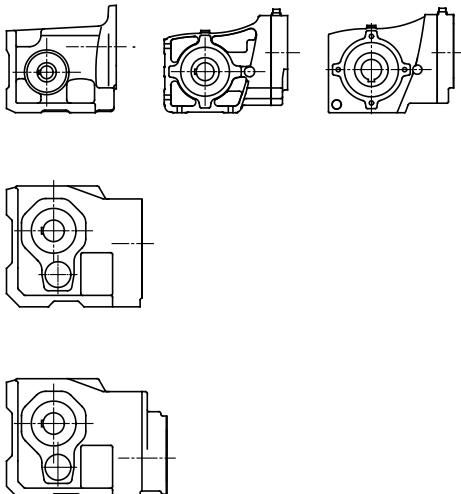
Gear unit types / Type designations	
<p>Bevel gear units</p> <p>SK 92072, SK 92172, SK 92372, SK 92672, SK 92772 SK 92072.1, SK 92172.1, SK 92372.1, SK 92672.1, SK 92772.1, SK 93072.1, SK 93172.1, SK 93372.1, SK 93672.1, SK 93772.1 (2-stage) SK 9012.1, SK 9016.1, SK 9022.1, SK 9032.1, SK 9042.1, SK 9052.1, SK 9062.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1 (3-stage) SK 9013.1, SK 9017.1, SK 9023.1, SK 9033.1, SK 9043.1, SK 9053.1 (4-stage)</p>	
	
Versions / Options	
<ul style="list-style-type: none"> - Foot-mounted version A Hollow shaft version V Solid shaft version L Solid shaft both sides Z Output flange B14 F Output flange B5 X Foot mounting D Torque arm K Torque bracket S Shrink disc VS Reinforced shrink disc EA Hollow shaft with internal spline R Back stop B Fastening element 	<ul style="list-style-type: none"> H Covering cap as contact guard H66 Covering cap IP66 VL Reinforced bearings VLII Agitator version VLIII Drywell agitator version SCX Screw Conveyor Flange IEC Standard IEC motor mounting NEMA Standard NEMA motor attachment W Free input shaft VI Viton radial seals OA Oil expansion tank SO1 Synthetic oil ISO VG 220 CC Casing cover with cooling spiral

Table 8: Bevel gear units - Type designation and gear unit types

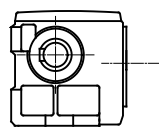
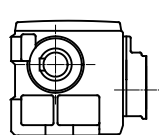
Gear unit types / Type designations			
Helical worm gear units SK 02040, SK 02050, SK 12063, SK 12080, SK 32100, SK 42125 (2-stage) SK 13050, SK 13063, SK 13080, SK 33100, SK 43125 (3-stage)			
 			
Versions / Options			
-	Foot mounting with solid shaft	B	Fastening element
A	Hollow shaft version	H	Covering cap as contact guard
V	Solid shaft version	H66	Covering cap IP66
L	Solid shaft both sides	VL	Reinforced bearings
X	Foot mounting	IEC	Standard IEC motor mounting
Z	Output flange B14	NEMA	Standard NEMA motor attachment
F	Output flange B5	W	With free drive shaft
D	Torque support	VI	Viton radial seals
S	Shrink disc	OA	Oil expansion tank

Table 9: Helical worm gear units - Type designation and gear unit types

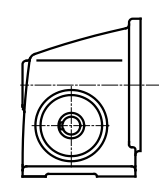
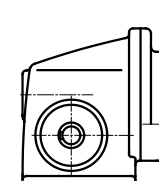
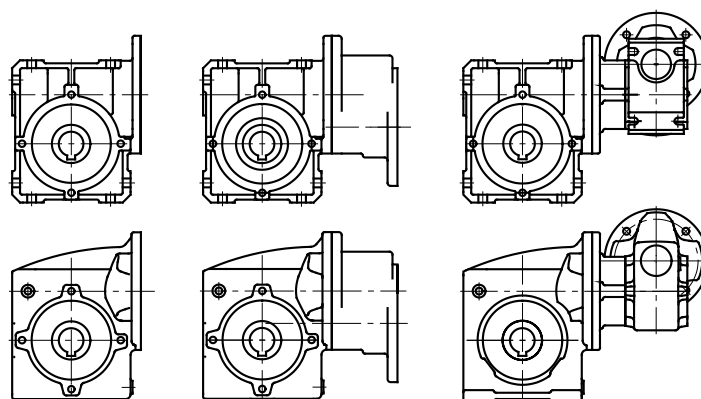
Gear unit types / Type designations			
MINIBLOC worm gear units SK 1S 32, SK 1S 40, SK 1S 50, SK 1S 63, SK 1SU..., SK 1SM 31, SK 1SM 40, SK 1SM 50, SK 1SM 63, (1-stage) SK 2S32NB, SK 2S40NB, SK 2S50NB, SK 2S63NB, SK 2SU..., SK 2SM40, SK 2SM50, SK 2SM63 (2-stage)			
 			
Versions / Options			
-	Foot mounting with solid shaft	X	Foot mounting
A	Hollow shaft version	B	Fastening element
V	Solid shaft version	IEC	Standard IEC motor mounting
L	Solid shaft both sides	NEMA	Standard NEMA motor attachment
Z	Output flange B14	W	With free drive shaft
F	Output flange B5	VI	Viton radial seals
D	Torque support		

Table 10: MINIBLOC - Type designation and gear unit types

Gear unit types / Type designations

UNIVERSAL worm gear units

SK 1SI31, SK 1SI40, SK 1SI50, SK 1SI63, SK 1SI75,
 SK 1SID31, SK 1SID40, SK 1SID50, SK 1SID63, SK 1SID75
 SK 1SIS31, ..., SK 1SIS75,
 SK 1SD31, SK 1SD40, SK 1SD50, SK 1SD63,
 SK 1SIS-D31, ..., SK 1SIS-D63
 SK 1SMI31, SK 1SMI40, SK 1SMI50, SK 1SMI63, SK 1SMI75
 SK 1SMID31, ..., SK 1SMID63 (1-stage)
 SK 2SD40, SK 2SD50, SK 2SD63, SK 1SI.../31, SK 1SI.../H10,
 SK 2SID40, ..., SK 2SID63
 SK 2SIS-D40, ..., SK 2SIS-D63
 SK 2SMI40, SK 2SMI50, SK 2SMI63
 SK 2SMID40, SK 2SMID50, SK 2SMID 63 (2-stage)



Versions / Options

V	Solid shaft or plug-in shaft	H10	Modular helical pre-stage
A	Hollow shaft version	/31	Worm pre-stage
L	Solid shaft both sides	/40	Worm pre-stage
X	Feet on three sides	IEC	Standard IEC motor mounting
Z	Output flange B14	NEMA	Standard NEMA motor attachment
F	Output flange B5	W	With free drive shaft
D	Torque support	VI	Viton radial seals
H	Covering cap		

Table 11: UNIVERSAL worm gear units - Type designation and gear unit types

Double gear units consist of two single gear units. They are to be treated as per the instructions in this Manual, i.e. as two individual gear units.

Type designation for double gear units: e.g. SK 73 /22 (consisting of single gear units SK 73 and SK 22).

3 Assembly instructions, storage, preparation, installation

Please observe all general safety instructions (please see chapter 1.4 "Safety information"), the safety information in the individual sections and the proper use (please see chapter 1.3 "Correct use")bestimmungsgemäße Verwendung.

3.1 Transporting the gear unit



WARNING

Hazard due to heavy loads

Severe injuries and material damage due to falling or tipping heavy loads are possible.

- Standing under the gear unit during transport is **extremely dangerous**.
- To prevent injury, **the danger area must be generously cordoned off**.
- Only transport using the eyebolts attached to the gear unit.
- No additional loads may be attached.
- If geared motors have an additional eyebolt attached to the motor, this must also be used.
- The thread of the eyebolt must be fully screwed in.
- Avoid pulling the eyebolts at an angle.

NOTICE

Gear unit damage

Damage to the gear unit due to improper use is possible.

- Prevent damage to the gear unit. Impacts to the free ends of the shafts may cause internal damage to the gear unit.
- Use adequately dimensioned and **suitable means of transportation**. Lifting tackle must be designed for the weight of the gear unit. The weight of the gear unit can be obtained from the dispatch documents.

3.2 Storage

For short-term storage before commissioning, please observe the following:

Store in the installation position (please see chapter 6.1 "Configurations and maintenance") and secure the gear unit against falling,

- Lightly oil bare metal housing surfaces and shafts
- Store in a dry place.
- Temperature in the range from – 5 °C to + 50 °C without large fluctuations,
- Relative humidity less than 60 %,
- No direct exposure to sunlight or UV light,
- No aggressive, corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity,
- No vibration or oscillation

3.3 Long-term storage



CAUTION

Injury to persons

Incorrect, or excessively long storage may result in malfunctions of the gear unit.

Perform an inspection of the gear unit prior to commissioning if the permissible storage time has been exceeded.



Information

Long-term storage

For storage or standstill periods in excess of 9 months, Getriebebau NORD recommends the long-term storage option.

With the long-term storage option and the use of the measures listed below, storage for up to 2 years is possible. As the actual influences on the unit greatly depend on the local conditions, these times should only be regarded as guide values.

Conditions of the gear unit and storage area for long-term storage prior to commissioning:

- Store in the installation position (please see chapter 6.1 "Configurations and maintenance") and secure the gear unit against falling.
- Transportation damage to the external paint must be repaired. Check that a suitable rust inhibitor is applied to the flange bearing surfaces. If necessary apply a suitable rust inhibitor to the surfaces.
- Gear units with the long-term storage option are completely filled with lubricant or have VCI corrosion protection agent mixed with the gear oil (see adhesive label on the gear unit, or are not filled with oil, but rather with small quantities of VCI concentrate.
- The sealing band in the vent plug must not be removed during storage. The gear unit must remain sealed tight.
- Store in a dry place.
- In tropical regions, the gear unit must be protected against damage by insects
- Temperature in the range from – 5 °C to + 40 °C without large fluctuations,
- Relative humidity less than 60 %,
- No direct exposure to sunlight or UV light,
- No aggressive, corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity,
- No vibration or oscillation

Measures during storage or standstill periods

- If the relative humidity is <50 % the gear unit can be stored for up to 3 years.

Measures before commissioning

- If the storage or standstill period exceeds 2 years or the temperature during short-term storage has greatly deviated from the standard range, the lubricant in the gear unit must be replaced before commissioning.
- If the gear unit is completely filled, the oil level must be reduced before commissioning.
- For gear units without oil filling, the oil level for the version must be filled before commissioning. The VCI concentrate may remain in the gear unit. Lubricant quantities and types must be filled according to the details on the type plate.

3.4 Inspecting the drive unit

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.

The drive unit must be inspected and may only be installed if:

- No damage, e.g. due to storage or transport is apparent. In particular the radial seals, the sealing caps and the covers must be inspected for damage.
- No leakage or no oil loss is visible.
- No corrosion or other indications of incorrect or damp storage is apparent.
- The packaging material has been completely removed.

3.5 Checking the type plate data

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

It must be checked and ensured that the gear unit type, all technical data and the ATEX labelling conform to the planning of the plant or the machine.

The type plate must be firmly attached to the gear unit and must not be subjected to permanent soiling. Please contact the NORD service department if the type plate is illegible or damaged.

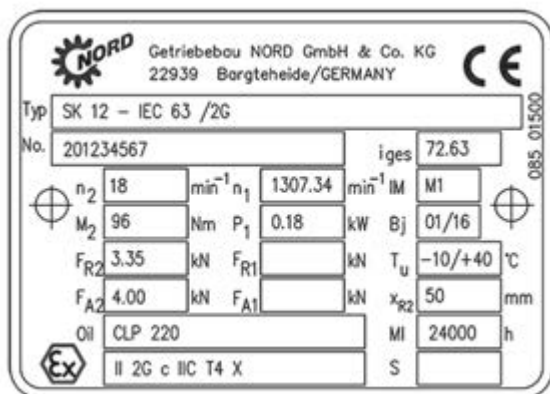



Fig. 1:Type plate (example)

Explanation of the type plate			
Abbreviations	Unit	Designation	See Section
Type	-	NORD gear unit type	
No.	-	Serial number	
iges	-	Overall gear unit ratio	
n2	rpm	Rated speed of gear unit output shaft*	
n1	rpm	Rated speed of the gear unit drive shaft or the drive motor*	
IM	-	Configuration (installation orientation)	6.1
M2	Nm	Max. permissible gear unit output shaft torque	
P1	kW	Max. permissible drive power or motor power	
Bj	-	Year of manufacture:	
FR2	kN	Max. permissible transverse force on the gear unit output shaft	3.9
FR1	kN	Max. permissible transverse force on the gear unit drive shaft for option W	3.9
Tu	°C	Permissible ambient temperature for the gear unit	
FA2	kN	Max. permissible axial force on the gear unit output shaft	3.9
FA1	kN	Max. permissible axial force on the gear unit drive shaft for option W	3.9
MI	h	Interval for general overhaul of the gear unit in operating hours or according to the specification of the dimensionless maintenance class CM	5.2
xR2	mm	Max. dimension for the point of application of the transverse force FR2	3.9
Oil	-	Gear unit oil type (standard designation)	6.2
Last line 	-	Labelling as per ATEX (DIN EN 13463-1): 1. Group (always II, not for mines) 2. Category (2G, 3G for gas or 2D, 3D for dust) 3. Ignition protection type if fitted (c) 4. Explosion group if applicable (IIC, IIB) 5. Temperature class (T1-T3 or T4 for gas) or max. surface temperature (e.g. 125°C for dust) or special max. surface temperature see special documentation (TX) 6. Temperature measurement on commissioning (X)	4.3
S	-	Number of the special documentation, consisting of serial no. / year	

* The maximum permissible speeds are 10% above the rated speed, if the maximum permissible drive power P1 is not exceeded.

If the fields FR1, FR2, FA1 and FA2 are empty, the forces are zero. If the field xR2 is empty, the point of application of force FR2 is central on the driven shaft journal (please see chapter 3.9 "Fitting hubs on the gear shafts").

Please note that for geared motors (gear units with attached electric motors) the electric motor has its own type plate and separate ATEX designation. The motor labelling must also comply with data for the planning of the plant or the machine.

The lowest explosion protection level on the gear unit and the motor labelling applies for the geared motor unit.

If the electric motor is driven with a frequency inverter, the motor requires ATEX approval for inverter operation. If the motor is operated with an inverter, significant differences between the nominal speeds on the type plates of the motor and the gearbox are normal and permissible. For operation of the motor with the mains supply, differences of the nominal speeds on the motor and the gear unit of up to ± 60 rpm are permissible.

3.6 Checking the configuration

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The gear unit may only be operated in the stated configuration.
- The permissible configuration is stated on the type plate (IM...). If an X is present in the field IM, the special documentation, whose number is in field S, must be observed. Section 6.1 "Configurations and maintenance", or the special documentation, shows the configuration of the individual types of gear units.
- It must be checked and ensured that the configuration as stated on the type plate complies with the installation orientation and that the installation orientation does not change during operation.
- The UNIVERSAL worm gear units type SK1SI... do not depend on the configuration, as with these types of gear unit, the abbreviation UN is entered in the IM field of the type plate.

3.7 Preparing for installation



CAUTION

Injury to persons

Transport damage may cause malfunctions of the gear unit, which may cause material damage or personal injury.

Please inspect the delivery for transport and packaging damage immediately on receipt. Report any damage to the carrier immediately. Gear units with transport damage must not be commissioned.

The drive unit must be inspected and may only be installed if no transportation damage or leaks are visible. In particular the radial seals and the sealing caps must be inspected for damage.

Pay attention to leaked lubricants, they may cause slips.

All bare metal surfaces and shafts of the gear unit are protected against corrosion with oil, grease or corrosion protection agents before shipping.

Thoroughly remove all oil, grease or corrosion protection agents and any dirt from the shafts and flange surfaces before assembly.



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

Care must be taken that drive elements attached to the gear unit, such as clutches, pulleys etc. and drive motors are also ATEX-compliant.

In applications where an incorrect rotational direction may result in damage or potential risk, the correct rotational direction of the output shaft is to be established by test running the drive when uncoupled and guaranteeing such for subsequent operation.

Gears with integrated return stops are marked with arrows on the drive/driven sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, it must be ensured that the gear unit can only operate in the direction of rotation. (For further explanations see catalogue G1000 and WN 0-000 40)

NOTICE

Gear unit damage

For gear units with an integrated back stop, switching the drive motor to the blocked direction of rotation, i.e. incorrect direction of rotation, may result in damage to the gear unit.

Take care that the direction of rotation of the gear unit is correct when connecting the motor and the motor control unit.

Ensure that no aggressive or corrosive substances are present in the area surrounding the installation site or are subsequently expected during operation, which attack metal, lubricants or elastomers. In case of doubt, please contact Getriebebau NORD and take the recommended action.

Oil expansion tanks (Option OA) must be fitted in accordance with works standard WN 0-530 04. For M10 x 1 screw fittings, the enclosed factory standard WN 0-521 35 must also be observed.

Oil level tanks (Option OT) must be fitted in accordance with works standard WN 0-521 30. Screw the enclosed M12x1.5 pressure relief screw into the tank.

The pressure vent must be activated prior to commissioning. To activate, remove the transport securing devices.

Double gear units consist of two single units and are equipped with 2 oil chambers and 2 pressure vents. Position of the vent plug (please see chapter 6.1 "Configurations and maintenance").

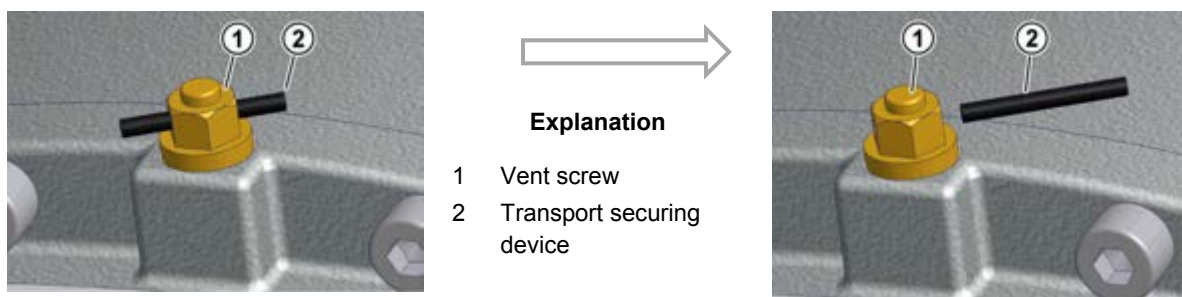


Figure 2: Activation of the pressure vent

3.8 Installing the gear unit

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- No explosive atmosphere must be present when installing the gear unit.
- The cooling air supplied to the gear unit/geared motor must be within the permissible temperature range stated on the type plate.
- In case of direct sunlight falling onto the gear unit, the cooling air supplied to the gear unit/geared motor must be at least 10°C below the highest permissible temperature of the ambient temperature range T_u , which is stated on the type plate.

WARNING

Danger of burns

The surfaces of gear units or geared motors may become hot during or shortly after operation.

Hot surfaces which can be touched directly must be protected with a contact guard.

NOTICE

Damage to the gear unit due to overheating

The gear unit may be damaged by overheating.

During installation::

- Ensure a free flow of air to all sides of the gear unit.
 - Ensure adequate space around the gear unit.
 - With geared motors, the cooling air of the motor fan must be able to flow unobstructed onto the gear unit.
 - Do not enclose or encase the gear unit/geared motor.
 - Do not subject the gear unit to highly energetic radiation.
 - Do not direct warm exhaust air from other units onto the gear unit/geared motor.
 - The base or flange to which the gear unit is attached must not input any heat into the gear unit during operation.
 - Do not allow dust to accumulate in the area of the gear unit
-

The base or flange to which the gear unit is fitted should be vibration-free, torsionally rigid and flat (flatness error <0.2 mm).

All contamination to the bolting surfaces of gear unit and base and/or flange must be thoroughly removed.

The gear housing must always be earthed. With geared motors, earthing via the motor connection must be ensured.

The gear unit must be precisely aligned with the drive shaft of the machine in order to prevent additional forces from being imposed on the gear unit due to distortion.

Welding of the gear unit is prohibited. The gear unit must not be used as the earth connection for welding work, as this may cause damage to the bearings and gear wheels.

The gear unit must be installed in the correct orientation (please see chapter 3.6 "Checking the configuration") **and** (please see chapter 6.1 "Configurations and maintenance").

All gear unit feet and/or all flange bolts on each side must be used. Bolts must have a minimum quality of 10.9. The bolts must be tightened to the correct torques (please see chapter 6.3 "Torque values"). Tension-free bolting must be ensured, particularly for gear units with a foot and flange.

Oil checking and oil drain screws must be accessible.

3.9 Fitting hubs on the gear shafts

NOTICE

Gear unit damage

The gear unit may be damaged by axial forces.

Do not subject the gear unit to harmful axial forces when fitting the hubs. In particular, do not hit the hubs with a hammer.

Drive and driven elements, e.g. coupling and chain-wheel hubs must be mounted onto the drive and driven shaft of the gear unit using suitable pullers that will not apply damaging axial forces onto the gear unit. In particular, do not hit the hubs with a hammer.

i Information

Assembly

Use the end thread of the shafts for pulling. Fitting can be aided by coating the hub with lubricant or heating it up to approx. 100°C beforehand.

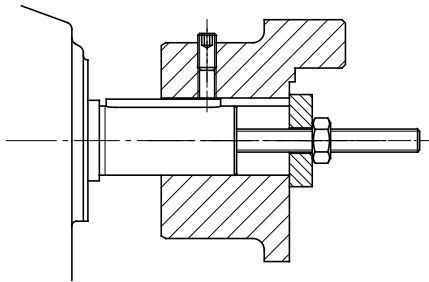


Figure 3: Example of a simple pulling device

! DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

Care must be taken that drive and driven elements attached to the gear unit must also be ATEX-compliant.

! DANGER!

Severe personal injury

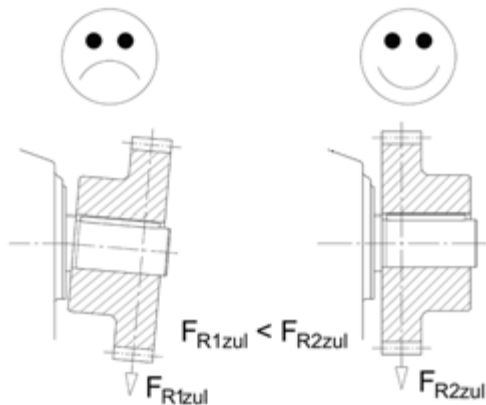
There is a danger of injury due to rapidly rotating drive and driven elements.

Drive and driven elements, such as belt drives, chain drives, shrink disks, fans and couplings must be fitted with contact protection.

Driven elements must only introduce the maximum radial transverse forces F_{R1} and F_{R2} as stated in the catalogue and the axial forces F_{A1} and F_{A2} into the gear unit(please see chapter 3.5 "Checking the type plate data"). Observe the correct tension, particularly on belts and chains.

Additional loads due to unbalanced hubs are not permitted.

The transverse force must be applied as closely as possible to the gear unit.



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The transverse force must be applied to the gear unit as closely as possible.
- For drive shafts with free shaft ends – Option W – the maximum permissible transverse force $FR1$ applies for the application of the transverse force to the centre of the free shaft journal.
- For output shafts, the application of the transverse force $FR2$ must not exceed the dimension $XR2$.
- If the transverse force $FR2$ for the output shaft is stated on the type plate, but no dimension $XR2$ is stated, the application of the force is assumed to be to the centre of the shaft journal.

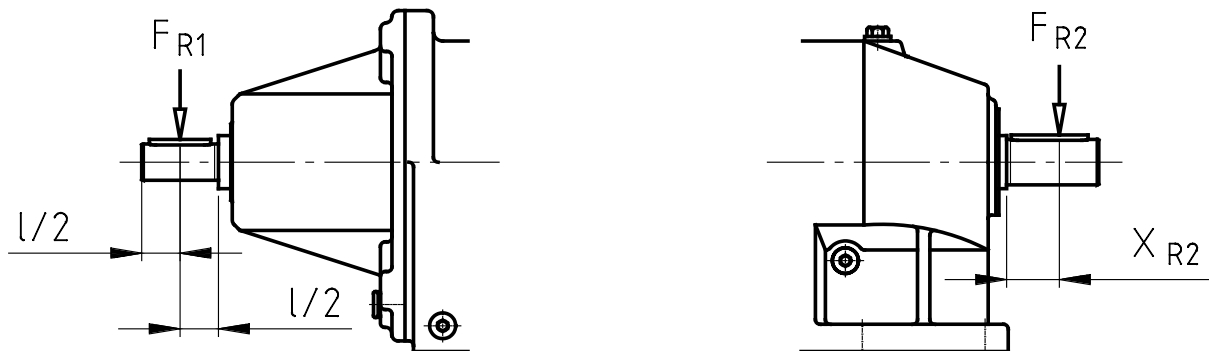


Figure 4: Permissible application of force to drive and driven shafts

3.10 Fitting push-on gear units

NOTICE

Gear unit damage

The bearings, gear wheels, shafts and housing may be damaged by incorrect fitting.

- Observe the assembly instructions.
- The push-on gear unit must be fitted onto the shaft using a suitable puller, which will not exert damaging axial forces on the gear unit. In particular, do not hit the gear unit with a hammer.

Assembly and subsequent dismantling is aided by applying an anti-corrosive lubricant to the shaft before fitting (e.g. NORD Anti-Corrosion Part No. 089 00099). Excess grease or anti-corrosion agent may escape after assembly and may drip off. Clean these points on the driven shaft after a running-in time of approx. 24 hours. This escape of grease is not due to a leak in the gear unit.

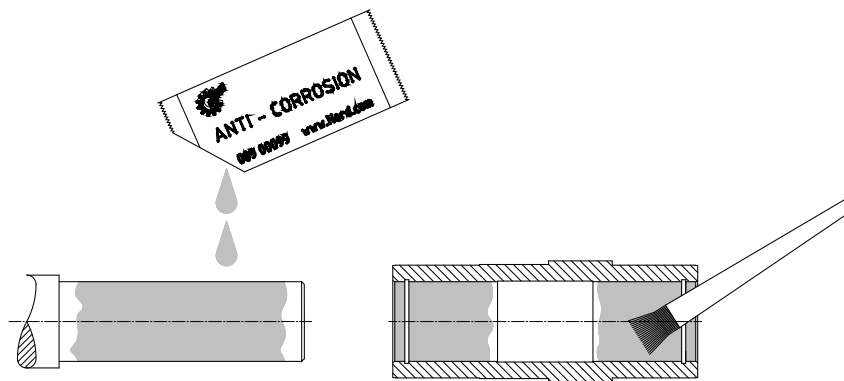


Figure 5: Applying lubricant to the shaft and the hub

i Information

Fastening element

The gear unit can be fitted to shafts with and without a shoulder using the fastening element (Option B). Tighten the bolt of the fastening element to the correct torque (please see chapter 6.3 "Torque values"). For gear units with option H66, the factory-fitted closing cap must be removed before assembly.

For push-on gear units with option H66 and fastening element (Option B) the pressed-in closing cap must be pushed out before fitting the gear unit. The pressed-in closing cap may be destroyed during dismantling. As standard a second closing cap is supplied as a loose spare part. After fitting the gear unit, fit the new / new condition closing cap as described in Section 3.12 "Fitting the covers".



Figure 6: Removing the factory-fitted closing cap

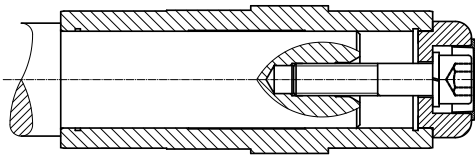


Figure 7: Gear unit mounted to shaft with a shoulder using the fastening element

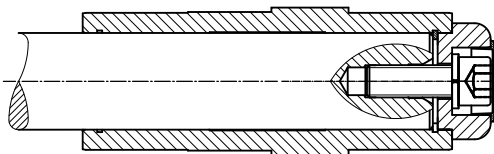


Figure 8: Gear unit mounted to shaft without a shoulder using the fastening element

A gear unit can be dismantled from a shaft with a shoulder using the following device, for example.

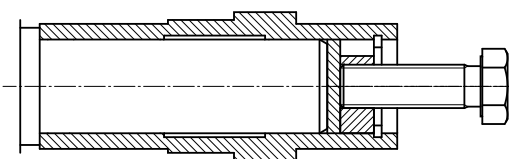


Figure 9: Dismantling using dismantling device

When assembling push-on gears with torque supports, the support must not be distorted. Tension-free mounting is aided by the rubber buffer (Option G or VG).

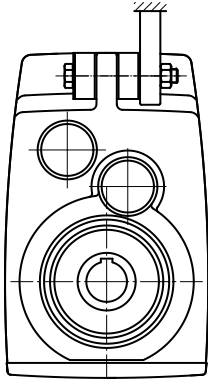


Figure 10: Mounting the rubber buffer (Option G and/or VG) on parallel shaft gear units

To fit the rubber buffer, tighten the screw fastening until there is no play between the contact surfaces when there is no load.

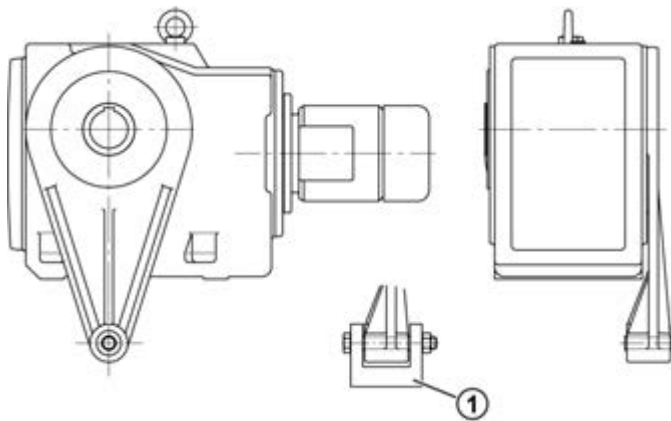
Then turn the fastening nut half a turn in order to pre-tension the rubber buffer (only applies for screw fastenings with adjusting threads). Greater pre-tension is not permissible.

WARNING

Risk of injury

The gear unit may suddenly rotate around the shaft if the bolts are loosened.

Secure the screw fastening against loosening, e.g. with Loctite 242 or a second nut.



Explanation

- 1 Always support torque support on both sides

Fig. 11: Attaching the torque support on bevel gear and worm gear units

Tighten the fastenings of the torque support with the correct tightening torques (please see chapter 6.3 "Torque values") and secure against loosening (e.g. Loctite 242, Loxeal 54-03).

3.11 Fitting shrink discs



CAUTION

Risk of injury

Risk of injury from incorrect mounting and dismantling of the shrink disc.

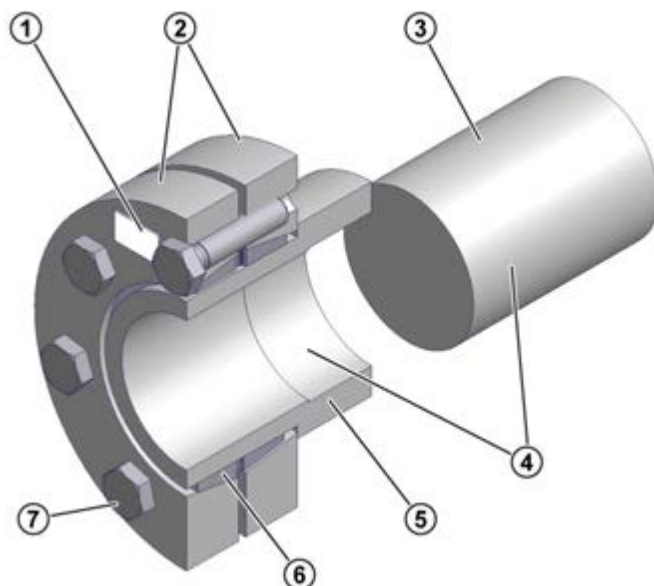
Observe the instructions.

NOTICE

Gear unit damage

If the tensioning bolts are tightened without the solid shaft inserted, the hollow shaft may be permanently deformed.

Do not tighten bolts if the solid shaft is not inserted!



Explanation

- 1 Shrink disc, type, part no. and torque details for tensioning screws
- 2 Tensioning flanges
- 3 Solid shaft of machine
- 4 Shaft and hollow shaft bore **FREE OF GREASE**
- 5 Hollow shaft of gear unit
- 6 Double half-slotted inner ring
- 7 Tensioning screws DIN 931 (933) -10.9

Figure 12: Hollow shaft with shrink disc

The shrink discs are supplied by the manufacturer ready for fitting. They must not be dismantled prior to fitting.

The solid shaft of the machine runs **free of grease** in the hollow shaft of the gear unit.

Assembly sequence

1. Remove any transport securing devices.
2. Loosen but do not remove tightening bolt and tighten gently by hand until there is no play between the flanges and the inner ring.
3. Slide the shrink disc onto the hollow shaft until the outer clamping flange is flush with the hollow shaft. The shrink disc is easier to slide on if the bore of the inner ring is lightly greased.
4. Prior to mounting, grease the solid shaft only in the area which will later come into contact with the bronze bush in the hollow shaft of the gear unit. Do not grease the bronze bush, in order to prevent grease penetrating the area around the shrink connection.
5. The hollow shaft of the gear unit must be completely de-greased and **completely free of grease**.
6. In the area of the shrink connection the solid shaft of the machine must be degreased and **completely free of grease**.
7. Insert the solid shaft of the machine into the hollow shaft so as to completely fill the area around the shrink connection.
8. Position the clamping flange by gently tightening the bolts.
9. Tighten the tensioning bolts successively in a clockwise direction by several turns – not crosswise – with approx. $\frac{1}{4}$ rotation per turn. Tighten the bolts with a torque wrench to the torque indicated on the shrink disc.
10. When the tensioning bolts have been tightened, there must be an even gap between the clamping flanges. If this is not the case, the gear unit must be dismantled and the shrink disc connection checked for correct fit.
11. The hollow shaft of the gear unit and the solid shaft of the machine should be marked with a line (felt-tip pen) in order to detect any slippage under load.

Dismantling sequence:

1. Loosen the tensioning bolts successively in a clockwise direction by several turns with approx. $\frac{1}{4}$ rotation per turn. Do not remove the bolts from their thread.
2. Loosen the clamping flanges from the cone of the inner ring.
3. Remove the gear unit from the solid shaft of the machine.

If a shrink disk has been in use for a long period or is dirty, it must be dismantled, cleaned and the conical surfaces coated with Molykote G Rapid Plus or a similar lubricant before it is refitted. The threads and head surfaces of the screws must be treated with grease without Molykote. Any damaged or corroded elements must be replaced.

3.12 Fitting the covers

⚠ DANGER!

Explosion hazard



Explosion hazard due to damaged and rubbing covers. Failure to comply may cause severe, or even fatal injuries.

- Damaged covers must not be used, as they may cause rubbing.
- Covers must be inspected for transportation damage e.g. dents and warping before they are fitted.

⚠ WARNING

Risk of injury

There is a danger of injury due to shrink discs and freely rotating shaft journals.

- Use a cover (Option H) as a guard.
- If this does not achieve sufficient protection against contact according to the required protection type, the machinery and plant constructor must ensure this by means of special attached components.

All fixing screws must be used and coated prior to use with a securing lubricant e.g. Loctite 242, Loxeal 54-03 and tightened to the correct torque (please see chapter 6.3 "Torque values"). For covers with Option H66, press in the new / new condition closing cap by tapping it lightly with a hammer.



Figure 13: Fitting the covers, Option SH, Option H, and Option H66

3.13 Fitting a standard motor

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Only standard motors with an adequate ATEX Zone category according to the type plate may be used.
- In addition, for ATEX category 2D gear units (see the ATEX labelling on the last line of the gear unit type plate), the motor must have at least protection class IP6x.

The maximum permitted motor weights indicated in the table below must not be exceeded:

Maximum permitted motor weights														
IEC motor size	63	71	80	90	100	112	132	160	180	200	225	250	280	315
NEMA motor size		56C	143T	145T	182T	184T	210T	250T	280T	324T	326T	365T		
Max. motor weight [kg]	25	30	40	50	60	80	100	200	250	350	500	700	1000	1500

WARNING

Risk of injury

Severe injuries may be caused by rapidly rotating parts when installing and servicing couplings.

Secure the drive unit against accidental switch-on.

Gear units with IEC/NEMA adapters must be operated with self-ventilated motors which comply with IC411 (TEFC) or IC416 (TEBC) externally ventilated motors compliant with EN60034-6, which generate a continuous airflow towards the gear unit. Please contact NORD if the use of IC410 (TENV) motors without fans is intended.

Assembly procedure to attach a standard motor to the IEC adapter (Option IEC/NEMA adapter)

1. Clean motor shaft and flange surfaces of motor and adapter and check for damage. The mounting dimensions and tolerances of the motor must conform to DIN EN 50347/NEMA MG1 Part 4.
2. Push the coupling sleeve onto the motor shaft so that the motor parallel key engages into the groove in the sleeve on tightening.
3. Tighten the coupling sleeve on the motor shaft in accordance with the motor manufacturer's instructions until it touches the collar. With motor sizes 90, 160, 180 and 225, any spacer bushes must be positioned between the coupling sleeve and the collar. With standard helical gear units, dimension B between the coupling sleeve and the collar must be observed (see Figure 14). Certain **NEMA adapters** require the adjustment of the coupling in accordance with the specifications indicated on the adhesive plate.
4. If the coupling half contains a threaded pin, the coupling must be secured axially on the shaft. The threaded pin must be coated prior to use with a securing lubricant e.g. Loctite 242, Loxeal 54-03 and tightened to the correct torque (please see chapter 6.3 "Torque values").

5. **The flange surfaces** of motor and adapter must be completely coated with **surface sealant** e.g. Loctite 574 or Loxeal 58-14 prior to mounting the motor, so that the flange seals after mounting. (only necessary for category 2D gear units – see ATEX labelling on the last line of the gear unit type plate) Sealing of the flange surfaces is also recommended for installation outdoors or in damp environments.
6. Mount the motor to the adapter. Do not forget to fit the gear rim or the sleeve (see Figure 14).
7. Tighten the adapter bolts to the correct torque (please see chapter 6.3 "Torque values").

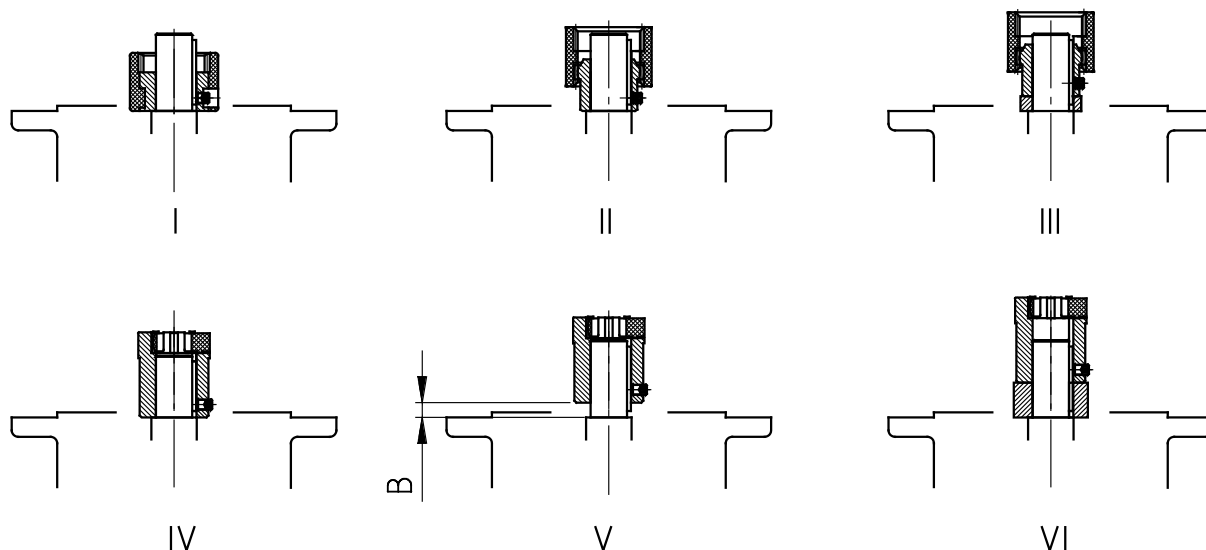


Figure 14: Fitting the coupling onto the motor shaft - various types of coupling

- I Curved tooth coupling (BoWex[®]) single part
- II Curved tooth coupling (BoWex[®]), two-part
- III Curved tooth coupling (BoWex[®]), two-part with spacer bush
- IV Claw coupling (ROTEX[®]), two-part
- V Claw coupling (ROTEX[®]), two-part, observe dimension B:

Standard helical gear unit:		
SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage)		
SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)		
	IEC size 63	IEC size 71
Dimension B (Fig. V)	B = 4.5 mm	B = 11.5 mm

- VI Claw coupling (ROTEX[®]), two-part with spacer bush

3.14 Fitting the cooling coil to the cooling system

WARNING

Risk of injury

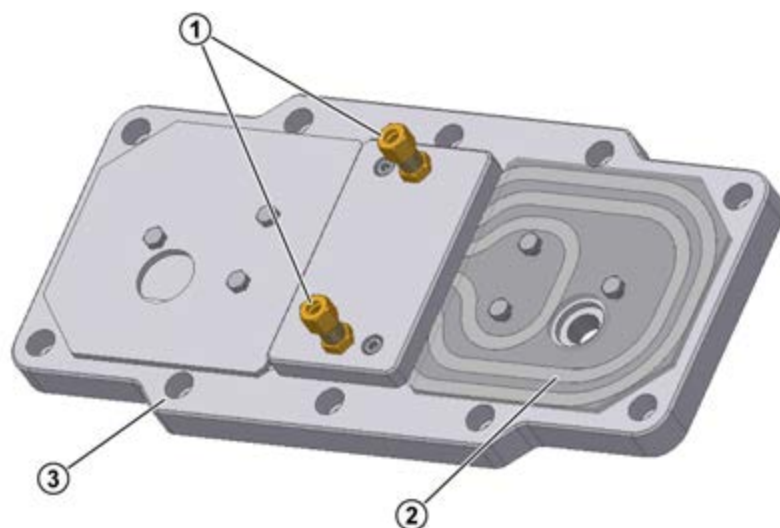
Possibility of injury due to pressure discharge.

Ensure that the pressure is released from the cooling circuit before carrying out any work on the gear unit.

The cooling coil is installed in the casing cover. Cutting ring screw threads according to DIN 2353 are located at the casing cover for the connection of a pipe with an external diameter of 10 mm.

Remove the closing cap from the screw neck prior to assembly to avoid any contamination of the cooling system. The screw necks should be connected with the coolant circuit, which must be provided by the operator. The flow direction of the coolant is irrelevant.

Make sure not to twist the screw necks during or after assembly as the cooling coil may be damaged. It must be ensured that no external forces act on the cooling coil.



Explanation

- 1 Cutting ring screw threads
- 2 Cooling coil
- 3 Housing cover

Figure 15: Cooling cover

3.15 Temperature sticker

⚠ DANGER!

Explosion hazard



Explosion hazard due to lack of labelling. Failure to comply may cause severe, or even fatal injuries.

With temperature class T4 gear units with a maximum surface temperature of less than 135 °C, the supplied self-adhesive temperature sticker (printed with value 121 °C) must be affixed to the gear unit housing. (Part No. 2839050)

The temperature class or the maximum surface temperature can be seen from the ATEX labelling in the last line of the type plate.

Examples: II 2G c IIC T4 X or II 3D 125 °C X

The temperature sticker must be affixed next to the oil level screw and (please see chapter 6.1 "Configurations and maintenance") towards the motor. For gear units with an oil level vessel, the temperature sticker must be affixed in the same position as for gear units without an oil level vessel. For gear units which are lubricated for life, without oil maintenance, the temperature sticker should be affixed next to the type plate.

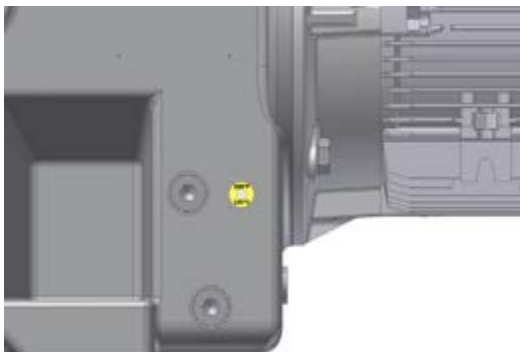
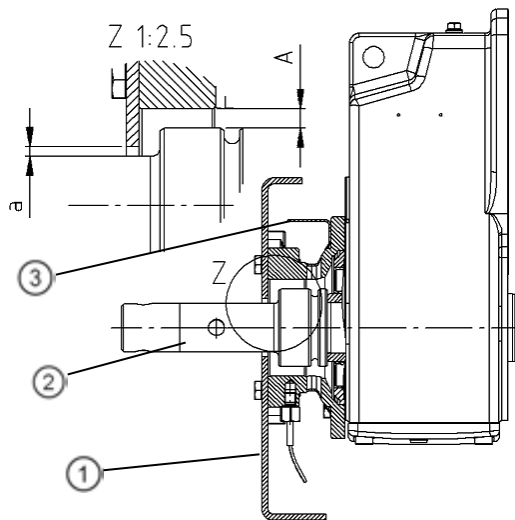


Fig. 16: Position of the temperature sticker

3.16 Installation example for an SCX flange

Note that the maximum gap (dimension a) between the push-in shaft and the rear wall of the conveyor channel or the fastening plate must not exceed $a = 8$ mm.



Explanations

- 1 Rear wall of conveyor trough
- 2 Plug-in shaft
- 3 Protective bracket

Fig. 17: Installation example for an SCX flange

Check the position of the protective bracket. The protective bracket must always cover the vertical open hole in the flange. The SCX flange may only be used in installation positions M1, M2, M3 and M4. A temperature sensor can be fitted as an option. The sensor must trigger at a temperature of 120°C and shut down the drive unit. Visual inspection is not required if a temperature sensor is used (please see chapter 5.1 "Service and Maintenance Intervals")

3.17 Installation of an oil expansion tank, Option OA

The expansion tank must be installed vertically with the hose connection facing downwards and the vent plug upwards. Please note the attached factory standard 0-530-04 for the installation.

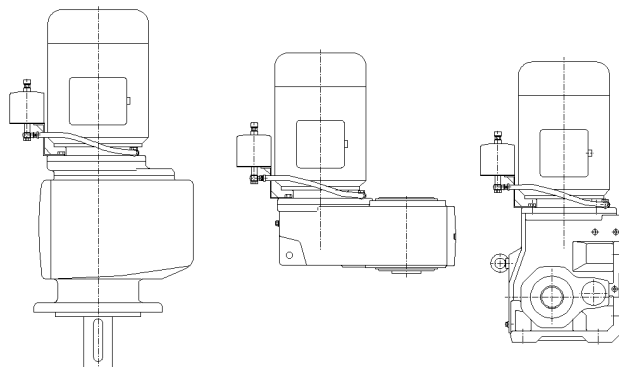


Figure 18: Installing the expansion tank

4 Commissioning

4.1 Check the oil level

DANGER!

Explosion hazard



Explosion hazard. Failure to observe this may cause severe, or even fatal injuries.
Before commissioning, the oil level must be checked with the supplied dipstick.

WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

The installation must comply with the configuration on the type plate. Section 6.1 "Configurations and maintenance" describes the configurations and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The vent must be in the position indicated in Section 6.1 "Configurations and maintenance".

The oil level does not need to be checked on gear units without oil level screw (please see chapter 6.1 "Configurations and maintenance").

Gear unit types that are not supplied full of oil must be filled before the oil level is checked. (please see chapter 5.2 "Service and Maintenance Work").

Check the oil level with an oil temperature of between 20°C to 40°C.

Checking the oil level:

1. The oil level may only be checked when the gear unit is at a standstill and has cooled down. The gear unit must be secured to prevent accidental switch-on.
2. Gear units with oil level screw:
 - Standard configuration M4 (V1 and V5) helical gear units have an angled pipe for checking the oil level as shown in Fig. 19 (right-hand illustration). This must point vertically upwards. Before checking the oil level, the pressure vent must be unscrewed.
 - Unscrew the oil level screw for the particular configuration (please see chapter 6.1 "Configurations and maintenance").
 - Check the oil level in the gear unit with the dipstick supplied (Part No.: 283 0050), as shown in Fig. 19 (left and right illustration). To do this, the part of the dipstick which is submerged in the oil must be held vertically.
 - The maximum oil level is the lower edge of the oil level hole.

- The minimum oil level is approx. 4 mm below the lower edge of the oil level hole. The dipstick then just dips into the oil.
- If the oil level is not correct, it must be adjusted by draining off oil or topping up with the type of oil stated on the type plate.
- If the screw lock coating in the thread of the oil drain screw or oil level screw is damaged, a new oil level screw must be used or the thread cleaned and coated with securing adhesive, e.g. Loctite 242, Loxeal 54-03 prior to insertion.
- Check the sealing ring for damage. Replace with a new sealing ring in case of damage.
- Fit the oil level screw together with the sealing ring and tighten to the correct torque (please see chapter 6.3 "Torque values").
- If the pressure vent has been unscrewed, reinsert it together with the sealing ring and tighten to the correct torque (please see chapter 6.3 "Torque values").

3. Gear units with an oil reservoir:

The oil level must be checked in the oil reservoir with the aid of the dipstick plug (thread G1 1/4). The oil level must be between the upper and lower marking when the dipstick is fully screwed in see Fig. 19 (centre illustration). These gearboxes may only be operated in the configuration stated in Section 6.1 "Configurations and maintenance".

4. Gear units with oil inspection glass:

- The oil level can be seen directly in the window
- The correct oil level is: the middle of the oil inspection glass.
- If the oil level is not correct, it must be adjusted by draining off oil or topping up with the type of oil stated on the type plate.

5. Final check:

- All previously removed screws must be screwed back in correctly.

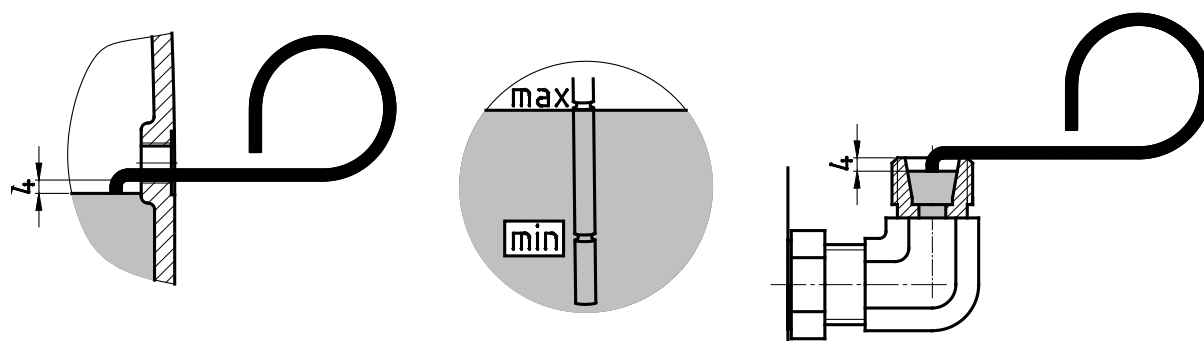


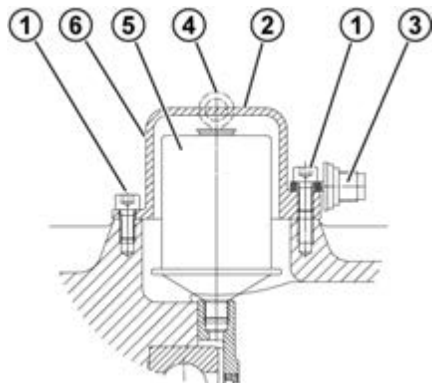
Fig. 19: Checking the oil level with a dipstick

4.2 Activating the Automatic Lubricant Dispenser

Some gear unit types with standard motor (Option IEC/NEMA) have an automatic lubricant dispenser for the roller bearings. This dispenser must be activated prior to commissioning. The cartridge case cover of the adapter for attaching an IEC / NEMA standard motor has a red information sign for the activation of the lubricant dispenser.

Activating the Automatic Lubricant Dispenser:

1. Loosen and remove the cylindrical screws.
2. Remove the cartridge cover.
3. Screw the activation screw into the lubricant dispenser until the lug breaks off at the defined fracture point
4. The **flange surfaces** of the cartridge cover must be completely coated with **surface sealant** e.g. Loctite 574 or Loxeal 58-14 prior to assembly, so that the cover seals after it has been fitted. (Only necessary for Category 2D gear units – see ATEX labelling, last line of the type plate)
5. Re-fit the cartridge cover and fasten it with the cylindrical screw (please see chapter 6.3 "Torque values").
6. Mark activation date on the adhesive label indicating the month/year



Explanation

- 1 Cylindrical screw M8 x 16
- 2 Cartridge cover
- 3 Activation screw
- 4 Lug
- 5 Lubricant sensor
- 6 Position of adhesive label

Fig. 20: Activating the automatic lubricant dispenser with standard motor mounting

Adhesive label:

Notice!																
Screw in the activation screw until the lug breaks off before commissioning the gear unit.																
Dispensing time: 12 Months																
Month			Activation date									Year				
1	2	3	4	5	6	7	8	9	10	11	12	06	07	08	09	10
												11	12	13	14	15

Fig. 21: Adhesive label

4.3 Temperature measurement

The details of the ATEX temperature class or the maximum surface temperature are based on normal installation conditions (please see chapter 3.7 "Preparing for installation"). Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

On commissioning, a surface temperature measurement of the gear unit must be made under maximum load.

(This does not apply to gear units which are labelled as temperature class T1 – T3 or a maximum surface temperature of 200 °C in the last line of the type plate.)

For the temperature measurement, a normal temperature measuring device is required, with a measurement range from 0 °C to 130 °C and a precision of at least ± 4 °C and which enables the measurement of the surface temperature and the temperature of the air. Temperature measurement procedure:

1. Allow the gear unit to run at maximum speed under maximum load for approx. 4 hours.
2. Following warm-up, the temperature of the gear unit housing surface T_{gm} must be measured close to the temperature indication label (please see chapter 3.15 "Temperature sticker").
3. Measure the temperature of the air T_{um} in the immediate vicinity of the gear unit.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

The gear unit must be shut down and Getriebebau NORD must be consulted if any of the following criteria do not apply:

- The measured air temperature T_{um} is within the permissible range stated on the type plate.
- The measured temperature of the surface of the gear unit housing T_{gm} is below 121 °C and the temperature indication label has not turned black (see Fig. 23).
- The measured temperature of the surface of the gear unit housing plus the difference between the highest permissible air temperature T_u stated on the type plate and the measured air temperature must be at least 15 °C lower than the maximum permissible surface temperature, i.e.:

ATEX labelling: II 2G c T4 / II 3G T4 :	$T_{gm} + T_u - T_{um} < 135\text{ °C} - 15\text{ °C}$
ATEX labelling: II 2D c T _{max} / II 3D T _{max} :	$T_{gm} + T_u - T_{um} < T_{max} - 15\text{ °C}$
T _{gm} :	Measured temperature of the surface of the gear unit housing in °C
T _{um} :	Measured air temperature in °C
T _{max} :	Maximum surface temperature according to gear unit type plate (ATEX labelling) in °C
T _u :	Upper value of the permissible ambient temperature range according to the type plate in °C

Fig. 22: ATEX labelling



Centre dot is **white**: OK

Centre dot is **black**: Temperature was too high.

Fig. 23: Temperature sticker

4.4 Operation with lubricant cooling

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

The temperature of the cooling water and the cooling water flow rate must be supervised and ensured by the operator.

The ATEX approval is void if these instructions are not observed!

NOTICE

Gear unit damage

The gear unit may be damaged by overheating.

The drive may only be commissioned after the cooling spiral has been connected to the cooling circuit, and the cooling circuit has been put into operation.

The coolant must have a similar thermal capacity as water (specific thermal capacity at 20 °C $c=4.18$ kJ/kgK). Industrial water without any air bubbles or sediments is recommended as a coolant. The hardness of the water must be between 1 dH and 15 dH; the pH value must be between pH 7.4 and pH 9.5. No aggressive liquids may be added to the coolant!

The **coolant pressure** must not exceed **8 bar**. The required **quantity of coolant** is **10 litres/minute**, and the **coolant inlet temperature** must not exceed 40°C; we recommend **10 °C**.

We also recommend fitting a pressure reducer or similar at the coolant inlet to avoid damage due to excessive pressure.

If there is a danger of frost the operator should add a suitable anti-freeze solution to the cooling water.

4.5 Checking the gear unit

During a test run under full load, the gear unit should be checked for:

- Unusual noises, such as grinding, knocking or rubbing noises
- Unusual vibrations, oscillations or other movements
- Production of steam or smoke

After the test run, the gear unit should be checked for:

- Leaks
- Slippage of the shrink disks. For this, the cover must be removed and a check carried out whether the marking described in Section 3.11 "Fitting shrink discs" shows a relative movement of the hollow shaft of the gear unit and the machine shaft. After this, the cover must be fitted as described in Section 3.12 "Fitting the covers".

Information

Lubrication of the shaft sealing rings

Shaft sealing rings are rubbing seals and have sealing lips made from an elastomer material. These sealing lips are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage.

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

The drive must be shut down and Getriebebau NORD consulted if any irregularities are observed during the checks described above.

4.6 Checklist

Checklist		
Subject of check	Date checked:	Information see Section
Is any transportation damage or damage apparent?		3.4
Does the labelling on the type plate conform to the specifications?		3.5
Does the configuration on the type plate conform to the actual installation?		3.6
Is the pressure vent screwed in?		3.7
Do all drive and driven elements have ATEX approval?		3.9
Are the external gear shaft forces within permitted limits (chain tension)?		3.9
Are contact guards fitted to rotating components?		3.12
Does the motor also have a relevant ATEX approval?		3.13
Is the temperature sticker affixed?		3.15
Has the correct oil level for the configuration been checked?		4.1
Is the automatic lubricant dispenser activated?		4.2
Has the temperature measurement been carried out?		4.3
Has the centre of the temperature sticker turned black?		4.3
Is the cooling cover connected to the cooling circuit?		3.14 4.4
Has the gear unit been checked with a test run?		4.5
Has the shrink disk connection been checked for slippage?		4.5

4.7 Operation of the gear unit in explosive areas

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- When operating the gear unit, the instructions in this operating manual must be complied with.
- The prescribed inspection and servicing intervals must be complied with.
- It must be ensured that the power ratings stated on the type plate are not exceeded. If, e.g. for variable speed drive units, there are several operating points, the maximum permissible drive power P1 or the maximum permissible torque on the driven shaft M2 or the maximum permissible speed must not be exceeded at any operating point. Overload of the gear unit must be ruled out.
- If the gear unit is equipped with a cooling coil, it may only be put into operation if the cooling coil has been connected to the cooling circuit and the cooling circuit is in operation. The temperature of the cooling fluid and the cooling fluid flow rate must be monitored and ensured by the operator.
- Gear units with an integrated back stop on the drive shaft may only be operated at more than the minimum speed of the gear unit drive shaft, $n_{1min} = 900$ rpm.
- The painting of the gear unit is designed for Category 2G Group IIB (Zone 1 Group IIB). **For use in Category 2G Group IIC (Zone 1 Group IIC)** the gear unit must not be used or installed in areas in which processes which cause electrostatic charging are to be expected. This also includes occasional manual rubbing of the gear unit housing; cleaning may only be carried out with a cloth which is moistened with water.
- During operation, if any of the irregularities described in Section 4.5 "Checking the gear unit" are detected, or the temperature sticker has turned black, the gear unit must be shut down and Getriebbau NORD must be consulted.

5 Service and maintenance

WARNING

Danger of burns

The surfaces of gear units or geared motors may become hot during or shortly after operation.

- Installation and maintenance work must only be performed when gear unit is at a standstill and has cooled down. The drive must be isolated and secured to prevent accidental start-up.
- Wear protective gloves.
- Shield hot surfaces with contact guards.

5.1 Service and Maintenance Intervals

Service and Maintenance Intervals	Service and Maintenance Work	Information see Section
Weekly or every 100 operating hours	<ul style="list-style-type: none"> • Visual inspection for leaks • Check the gear unit for unusual running noises and/or vibrations • Only for gear units with cooling cover: Visual inspection of the temperature sticker 	5.2
Every 2500 operating hours, at least every six months	<ul style="list-style-type: none"> • Check the oil level 	4.1
	<ul style="list-style-type: none"> • Visual inspection of the rubber buffer • Visual inspection of hose • Visual inspection of shaft sealing ring • Visual inspection of Option SCX 	5.2
	<ul style="list-style-type: none"> • Visual inspection of the temperature sticker 	5.2 4.3
	<ul style="list-style-type: none"> • Remove dust (only for category 2D) • Check coupling (Only for category 2G and standard IEC / NEMA motor attachment) • Re-grease / remove excess grease (only applicable for free drive shaft / Option W and for agitator bearings / Option VL2 / VL3) • Clean or replace the pressure venting screw 	5.2

Service and Maintenance Intervals	Service and Maintenance Work	Information see Section
Every 5000 operating hours, at least every year (Only for standard IEC/NEMA motor attachment)	<ul style="list-style-type: none"> Replace the automatic lubricant dispenser / remove excess grease 	5.2 4.2
For operating temperatures up to 80 °C. Every 10000 operating hours, at least every 2 years	<ul style="list-style-type: none"> Change the oil (The interval is doubled if filled with synthetic products) Check the cooling coil for deposits (fouling) Replace shaft sealing rings if worn 	5.2
Every 20000 operating hours, at least every 4 years	- Re-lubrication of the bearings in the gear unit	5.2
According to the interval specified in field MI of the type plate at least every 10 years (Only for Category 2G and 2D)	- General overhaul	5.2

i Information

Oil change intervals

The oil change intervals apply for normal operating conditions and operating temperatures up to 80°C. The oil change intervals are reduced in the case of extreme conditions (operating temperatures higher than 80°C, high humidity, aggressive environment and frequent fluctuations in the operating temperature).

5.2 Service and Maintenance Work

! DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- No explosive atmosphere must be present during servicing and repair work. Servicing and maintenance work must only be performed by qualified specialist personnel.
- When cleaning the gear unit, do not use procedures or materials which may cause electrostatic charging of the gear unit or adjacent non-conducting components.

! WARNING

Severe personal injury

Severe injury and material damage may be caused by incorrect servicing and maintenance work.

Servicing and maintenance work must only be performed by qualified specialist personnel. Wear the necessary protective clothing for servicing and maintenance work (e.g. industrial footwear, protective gloves, goggles, etc.)



WARNING

Severe personal injury

Risk of injury due to rapidly rotating and hot machine components.

Installation and maintenance work must only be performed when gear units are at a standstill and have cooled down. The drive must be isolated and secured to prevent accidental start-up.



WARNING

Severe personal injury

Particles or liquids thrown up during servicing and maintenance can cause injuries.

- Observe the safety information
- Pressure washers and compressed air must not be used for cleaning



WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

Visual inspection for leaks



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The gear unit must be checked for leaks. Attention should be paid to escaping gear oil and traces of oil on the exterior or underneath the gear unit. In particular, the radial seals, cover caps, screw plugs, hoses and housing joints should be checked.

If leaks are suspected, the gear unit should be cleaned, the oil level checked (please see chapter 4.1 "Check the oil level") and checked again for leaks after approx. 24 hours. If a leak is confirmed (dripped oil), the gear unit must be repaired immediately. Please contact the NORD service department.

If the gear unit is equipped with a cooling coil in the housing cover, the connections and the cooling coil must be checked for leaks. If there are any leaks, these must be repaired immediately. Please contact the NORD service department.

Check for running noises



DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- If the gear unit produces unusual running noises and/or vibrations, this could indicate damage to the gear unit. In this case the gear should be shut down and a general overhaul carried out.

Check the oil level

(please see chapter 4.1 "Check the oil level").

Visual inspection of the rubber buffer

Gear units with rubber buffers (Option G or VG) and gear units with torque supports are equipped with rubber elements. If these show damage such as tears to the rubber surface, the elements must be replaced. Please contact the NORD service department.

Visual inspection of hose

Gear units with an oil reservoir (Option OT) have rubber hoses. If damage to the external surface of the hoses as far as where they are inserted occurs, e.g. due to abrasions, cuts or tears, they must be replaced. Please contact the NORD service department.

Visual inspection of shaft sealing ring

Information

Shaft sealing rings

Shaft sealing rings are rubbing seals and have sealing lips made from an elastomer material. These sealing lips are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage (please see chapter 6.5 "Leaks and seals").

Visual inspection of Option SCX

Check the dirt outlet holes on the flange for dirt. The gap between the shaft and the fastening plate must be free from dirt. If severe soiling is apparent, pull the gear unit off the push-in shaft and clean the push-in shaft and the inside of the flange. Check the shaft sealing ring on the gear unit for damage. Damaged shaft sealing rings must be replaced with new rings. Mount the gear unit on the cleaned flange (please see chapter 3.10 "Fitting push-on gear units").

Visual inspection of the temperature sticker

(Only necessary for temperature class T4 or max. surface temperature < 135 °C)

DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Check whether the temperature sticker has turned black (please see chapter 3.15 "Temperature sticker"). If the temperature sticker has turned black, the gear unit has become too hot.

The cause of overheating must be established. Please contact the NORD service department immediately. The drive unit must not resume operation before the cause of overheating has been remedied and renewed overheating can be ruled out.

Before recommissioning, a new temperature sticker must be affixed to the gear unit (please see chapter 3.15 "Temperature sticker").

Remove dust

(Only necessary for Category 2D)

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- Dust deposits on the gear unit housing must be removed if they are more than 5 mm thick.

For gear units fitted with a cover (Option H), remove the cover. Dust deposits in the cover cap, on the output shaft and on the shrink disk must be removed. Then fit the cover cap (please see chapter 3.12 "Fitting the covers").

i Information

Cover caps

Some cover caps can be completely sealed with liquid sealing agent. In such cases, there is no need for regular cleaning of the covering cap if it is completely sealed with a liquid sealing agent such as Loctite 574 or Loxeal 58-14.

Checking the coupling

(Only necessary for Category 2G and IEC / NEMA standard motor attachments)

The motor must be removed. Plastic or elastomer coupling components must be examined for traces of wear. If the limiting values listed below for the particular coupling versions and sizes are exceeded, the plastic or elastomer coupling components must be replaced.

NOTICE

Replacement parts

Only use replacement parts with the same colour.

With claw couplings (ROTEX®) the tooth thickness of the elastomer gear rim must be measured as shown in the illustration. B_{min} is the minimum permitted tooth thickness.

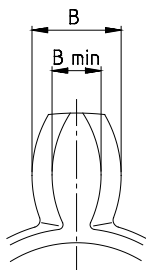


Fig. 24: Measurement of gear rim wearing on the ROTEX claw coupling®

Limiting wear values for coupling gear rims							
Type	R14	R24	R38	R42	R48	R65	R90
B [mm]	9.7	8.6	13.3	15.7	17.7	22.2	32.3
B _{min} [mm]	7.7	5.6	10.3	11.7	13.7	17.2	24.3

Table 12: Limiting wear values for coupling gear rims

For gear couplings, the limiting wear value is $X = 0.8$ mm, as shown in the following illustration.

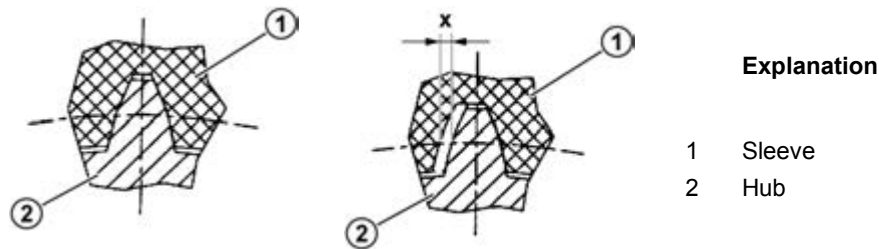


Fig. 25: Measurement of gear sleeve wear for gear BoWex couplings®

i Information

Coupling wear

If the examination only shows slight wear (25 % of the limiting value), it is permissible to extend the interval for examination of the coupling to twice the normal period, i.e. 5000 operating hours and at least every year.

Re-grease

Some gear unit designs (free drive shaft, Option W, agitator designs VL2 and VL3) are equipped with a re-greasing device.

For agitator versions VL2 and VL3, the vent screw located opposite to the grease nipple must be unscrewed before re-greasing. Grease should be injected until a quantity of 20 - 25 g escapes from the vent hole. After this, the vent plug must be reinserted and tightened.

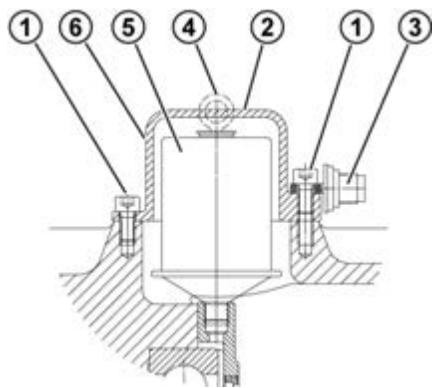
For Option W and some IEC adapters, the outer roller bearing must be re-greased with approx. 20 - 25 g of grease via the grease nipple provided. Excess grease must be removed from the adapter.

Recommended grease: Petamo GHY 133N (please see chapter 6.2 "Lubricants"), (Klüber Lubrication)

Cleaning or replacing the vent screw

Unscrew the pressure vent, thoroughly clean the vent screw (e.g. with compressed air) carry out a function test and fit the vent screw in the same place. If necessary, use a new vent screw.

Replacing the automatic lubricant dispenser



Explanation

- 1 Cylindrical screws M8 x 16
- 2 Cartridge cover
- 3 Activation screw
- 4 Lug
- 5 Lubricant sensor
- 6 Position of adhesive label

Fig. 26: Replacing the automatic lubricant dispenser with standard motor mounting

The cartridge cover must be unscrewed. Unscrew the lubrication dispenser and replace it with a new component (Part No. 283 0100). Excess grease must be removed from the adapter. Then carry out activation (please see chapter 4.2 "Activating the Automatic Lubricant Dispenser").

Change the oil

The illustrations in Section 6.1 "Configurations and maintenance" show the oil drain screw, the oil level screw and the pressure vent screw (if fitted) for various designs.

Procedure:

1. Place the drip tray below the oil drain screw
2. Completely remove oil level screw, screwed sealing plug with dipstick if an oil level tank is being used and oil drain screw.



WARNING

Danger of burns

Danger of burns due to hot oil.

- Allow the gear unit to cool down before carrying out maintenance or repair work.
- Wear protective gloves.

3. Drain all the oil from the gear unit.
4. If the sealing ring of the oil drain screw or oil level screw is damaged, a new oil level screw must be used or the thread cleaned and coated with securing adhesive, e.g. Loctite 242, Loxeal 54-03 prior to insertion.
5. Insert the oil drain screw into the hole and tighten to the correct torque (please see chapter 6.3 "Torque values").
6. Using a suitable filling device, refill with **oil of the same type** (please see chapter 3.5 "Checking the type plate data") and (please see chapter 6.2 "Lubricants") through the oil level hole until oil emerges from the oil level hole. (The oil can also be filled through the pressure vent screw or a sealing plug located higher than the oil level). If an oil level vessel is used, fill the oil through the upper inlet (thread G1¼) until the oil level is set as described in Section 4.1 "Check the oil level"
7. Wait at least 15 minutes, or at least 30 minutes if an oil level tank is used, and then check the oil level. Proceed as described in Section 4.1 "Check the oil level".



Information

Oil level / Oil fill quantities

The oil does not need to be changed in gear units without an oil drain screw (please see chapter 6.1 "Configurations and maintenance"). These gear units are lubricated for life.

Standard helical gear units in ATEX category 3G and 3D (please see chapter 3.5 "Checking the type plate data") do not have an oil level screw. Here, the oil is topped up through the threaded pressure vent bolt using the quantities listed in the table in the following table.



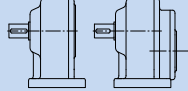


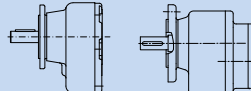
Oil fill volumes													
  Section 6.1							  Section 6.1						
	M1	M2	M3	M4	M5	M6		M1	M2	M3	M4	M5	M6
Gear unit type	Quantity [l]						Gear unit type	Quantity [l]					
SK 0	0.13	0.22	0.13	0.22	0.13	0.13	SK 0 F	0.13	0.22	0.13	0.22	0.13	0.13
SK 01	0.22	0.38	0.22	0.38	0.22	0.22	SK 01 F	0.22	0.38	0.22	0.38	0.22	0.22
SK 20	0.55	1.00	0.55	1.00	0.55	0.55	SK 20 F	0.35	0.60	0.35	0.60	0.35	0.35
SK 25	0.50	1.00	0.50	1.00	0.50	0.50	SK 25 F	0.50	1.00	0.50	1.00	0.50	0.50
SK 30	0.90	1.30	0.90	1.30	0.90	0.90	SK 30 F	0.70	1.10	0.70	1.10	0.70	0.70
SK 33	1.00	1.60	1.00	1.60	1.00	1.00	SK 33 F	1.00	1.50	1.00	1.50	1.00	1.00
SK 000	0.24	0.40	0.24	0.41	0.24	0.24	SK 000 F	0.24	0.41	0.24	0.41	0.24	0.24
SK 010	0.38	0.60	0.38	0.60	0.38	0.38	SK 010 F	0.35	0.65	0.40	0.74	0.50	0.30
SK 200	0.80	1.30	0.80	1.30	0.80	0.80	SK 200 F	0.65	0.95	0.70	1.10	0.80	0.50
SK 250	1.20	1.50	1.20	1.50	1.20	1.20	SK 250 F	0.90	1.40	1.00	1.60	1.30	0.80
SK 300	1.20	2.00	1.20	2.00	1.20	1.20	SK 300 F	1.25	1.50	1.20	1.80	1.30	0.95
SK 330	1.80	2.80	1.80	2.80	1.80	1.80	SK 330 F	1.60	2.50	1.60	2.90	1.90	1.40

Table 13: Oil fill quantities for standard helical gear units for ATEX category 3G and 3D

Checking the cooling coil for deposits

The inner surface of the cooling coil must be checked for deposits, as in case of severe deposits (fouling) the dissipation of heat is no longer guaranteed. In this case, the cooling coil must be cleaned. If a chemical cleaner is used, it must be ensured that the cleaning agent does not attack the material of the cooling coil (Copper pipe and yellow brass fittings).

Replacing the shaft sealing ring

Once the shaft sealing ring has reached the end of its service life, the oil film in the region of the sealing lip increases and a measurable leakage with dripping oil occurs.

The shaft sealing ring must then be replaced. The space between the sealing lip and the protective lip must be filled approximately 50 % with grease on fitting (recommended grease: PETAMO GHY 133N).

Take care that after fitting, the new shaft sealing ring does not run in the old wear track.

Re-lubricating bearings

For bearings which are not oil-lubricated and whose holes are completely above the oil level, replace the roller bearing grease (recommended grease: PETAMO GHY 133N). Please contact the NORD service department.

General overhaul

With Category 2G and 2D gear units, a general overhaul is necessary after a specified longer period of operation. The specification of the operating period in terms of operating hours, after which a general overhaul must be carried out, can be seen from the type plate data in field MI.

Alternatively, the maintenance class C_M can be used to determine the operating period after which a general overhaul must be carried out. The data in field MI of the type plate is then e.g.: MI $C_M = 5$.

The time for the general overhaul with the stated maintenance class C_M is calculated as follows:

$$N_A = C_M \cdot f_L \cdot k_A$$

N_A : Number of years since commissioning. With calculated values of N_A which exceed 10 years, a general overhaul is due 10 years after commissioning.

C_M : Maintenance class according to field MI of the type plate

f_L : Running time factor

$f_L = 10$ Running time maximum 2 hours per day

$f_L = 6$ Running time 2 to 4 hours per day

$f_L = 3$ Running time 4 to 8 hours per day

$f_L = 1.5$ Running time 8 to 16 hours per day

$f_L = 1$ Running time 16 to 24 hours per day

k_A : Utilisation factor

If the utilisation factor is not known, $k_A = 1$

Longer maintenance intervals often result if the actual power required by the application is known. The utilisation factor may be calculated as follows:

$$k_A = \left(\frac{P_1}{P_{tat}} \right)^3$$

P₁ Max. permissible drive power or motor power in kW according to the type plate

P_{tat}: Actual drive power or motor power in kW which is required by the application at the nominal speed. This is determined e.g. by measurements.

For variable loads with differing actual drive powers with nominal speeds P_{tat1}, P_{tat2}, P_{tat3}, ... with known percentage times q₁, q₂, q₃, ..., the following equivalent average drive power applies:

$$P_{tat} = \sqrt[3]{P_{tat1}^3 \cdot \frac{q_1}{100} + P_{tat2}^3 \cdot \frac{q_2}{100} + P_{tat3}^3 \cdot \frac{q_3}{100} + \dots}$$

 **DANGER!**

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

- The general overhaul must be carried out by qualified personnel in a specialist workshop with appropriate equipment in observance of national regulations and laws. We urgently recommend that the general overhaul is carried out by NORD Service.

If a general overhaul is due, the gear unit must be completely dismantled. The following work must be carried out:

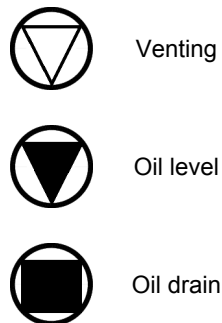
- Clean all gear unit components
- Examine all gear unit components for damage
- All damaged components must be replaced
- All roller bearings must be replaced
- Replace back stops if fitted
- Replace all seals, radial seals and Nilos rings
- Replace plastic and elastomer components of the motor coupling

6 Appendix

6.1 Configurations and maintenance

For versions which are not listed, please refer to the special documentation drawing (please see chapter 3.5 "Checking the type plate data").

Explanation of symbols for the following version illustrations:



Standard helical gear units

Standard ATEX category 3G and 3D helical gear units do not have oil filling screws (please see chapter 3.5 "Checking the type plate data").

Parallel shaft gear units

The following illustration applies for the M4 / H5 configuration of gear unit types SK 9282, SK 9382, SK 10282, SK 10382, SK 11282, SK 11382, SK 12382, SK10382.1, SK11382.1 with oil level tank.

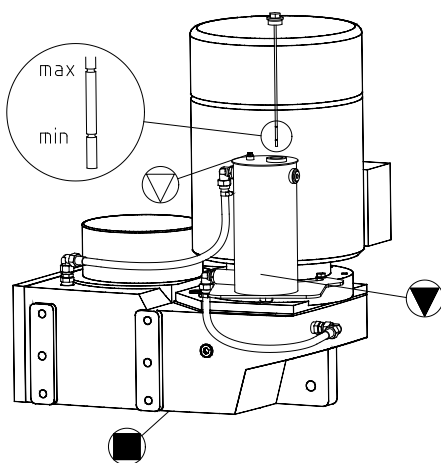


Figure 27: Parallel shaft gear units with oil level tank

Oil level screws are not fitted to gear unit types SK 0182 NB, SK 0282 NB and SK 1382 NB in the ATEX Categories 3G and 3D (please see chapter 3.5 "Checking the type plate data").

In Category 2G and 2D, types SK 0182 NB, SK 0282 NB and SK 1382 NB only have one oil level screw. These gear unit types have checkable life-long lubrication.

NORDBLOC helical gear units

Gear unit types SK 320, SK 172, SK 272, SK 372 and SK 273 and SK 373 are not fitted with oil level screws for ATEX Categories 3G and 3D (please see chapter 3.5 "Checking the type plate data").

In Category 2G and 2D, types SK 320, SK 172, SK 272, SK 372 and SK 273 and SK 373 only have one oil level screw. These gear unit types have checkable life-long lubrication.

NORDBLOC helical gear units SK072.1 and SK172.1

⚠ DANGER!

Explosion hazard



Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

Checking the oil level in configuration M4 for SK 072.1 and SK 172.1:

The oil level check for the M4 installation orientation must be carried out as follows in the installation orientation M2:

1. Bring the gear unit into the M2 installation orientation and remove the oil level screw for the M2 orientation.

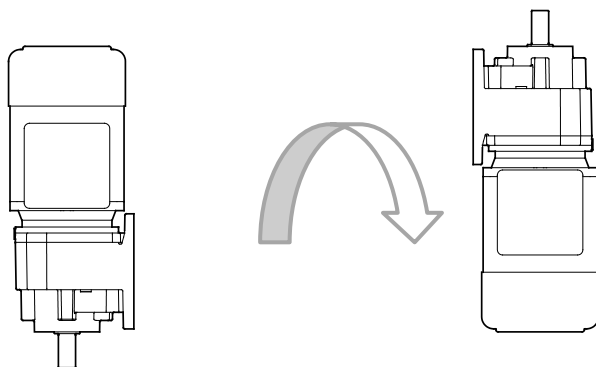
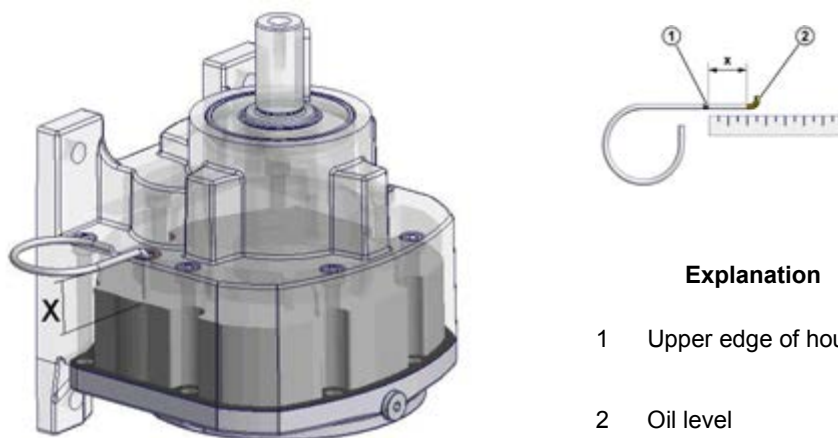


Figure 28: Bring the gear unit into the M2 installation orientation

2. Determine the measurement X between the upper edge of the gear unit housing and the oil level. If necessary, modify the dipstick (see Fig. 29 below).



Explanation

- 1 Upper edge of housing
- 2 Oil level

Fig. 29: Measuring the oil level

3. Compare the determined measurement X with the corresponding measurement in the following table. If necessary, adjust the oil level with the type of oil shown on the type plate.

Gear unit type	Thread size	Measurement X [mm]
SK 072.1	M8 x 1	22 ± 1 mm
SK 172.1	M8 x 1	20 ± 1 mm

- 4. Screw in and tighten the oil level screw in the installation orientation M2 as per Section 4.1 "Check the oil level".
- 5. Bring the gear unit back into the installation orientation M4.

UNIVERSAL worm gear units

SK 1SI 31 – SK 1SI 75

SK 1SIS 31 – SK 1SIS 75

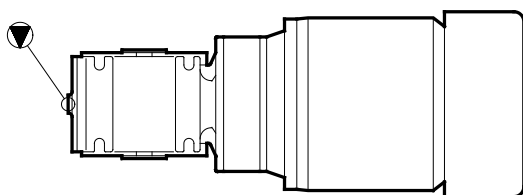


Fig. 30: Orientation for oil level check

For the **oil level check**, the gear unit or the geared motor must be brought into the orientation shown above. To do this, it may be necessary to remove the gear unit or the geared motor.

NOTICE

Settling time



An adequate settling time of the worm gear unit in the position shown in Fig. 30 must be observed, in order to allow the oil to settle evenly.

The oil level can then be checked as described in Section 4.1 "Check the oil level".

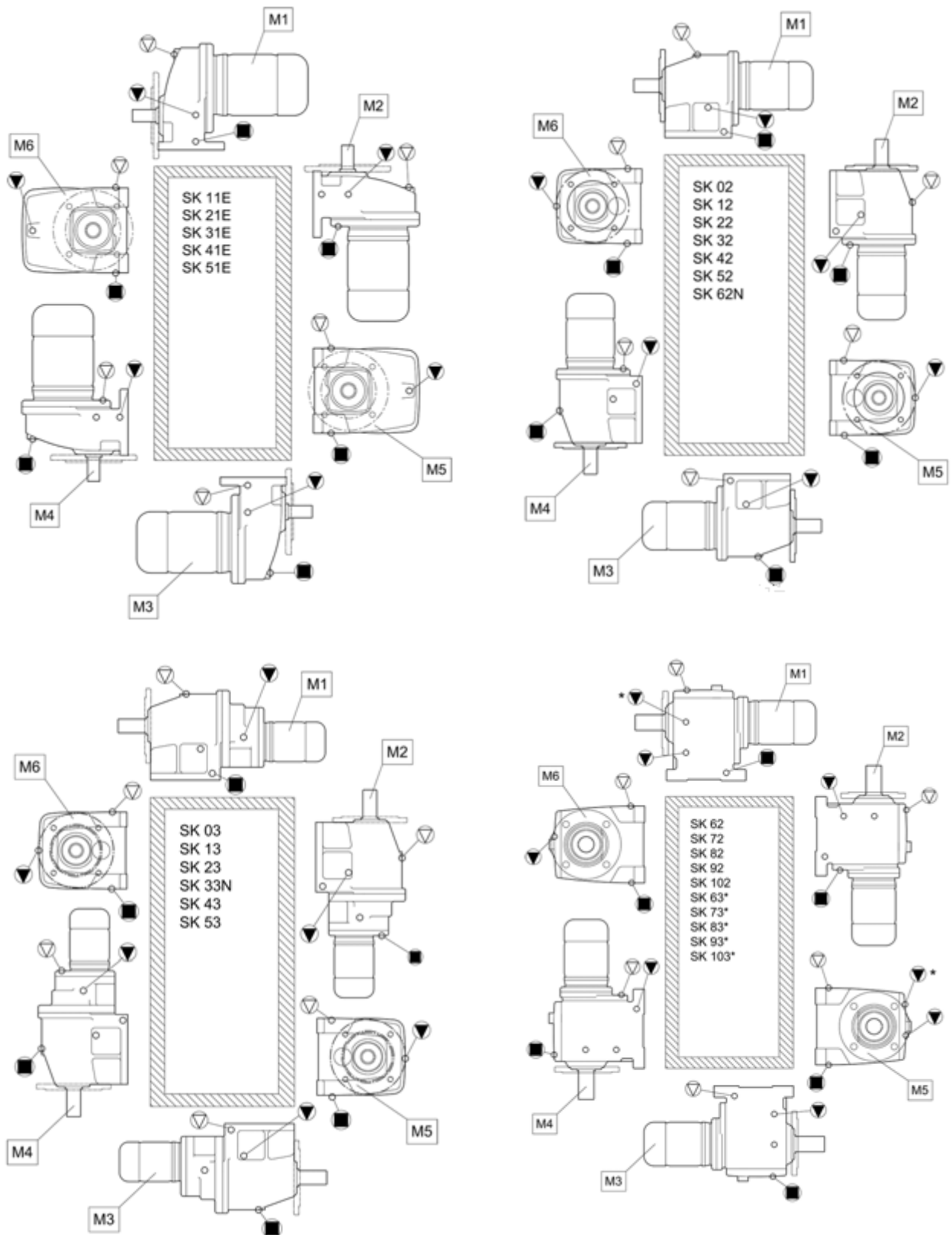
In Category 2G and 2D the gear units only have one oil level screw. These gear unit types have a checkable life-long lubrication.

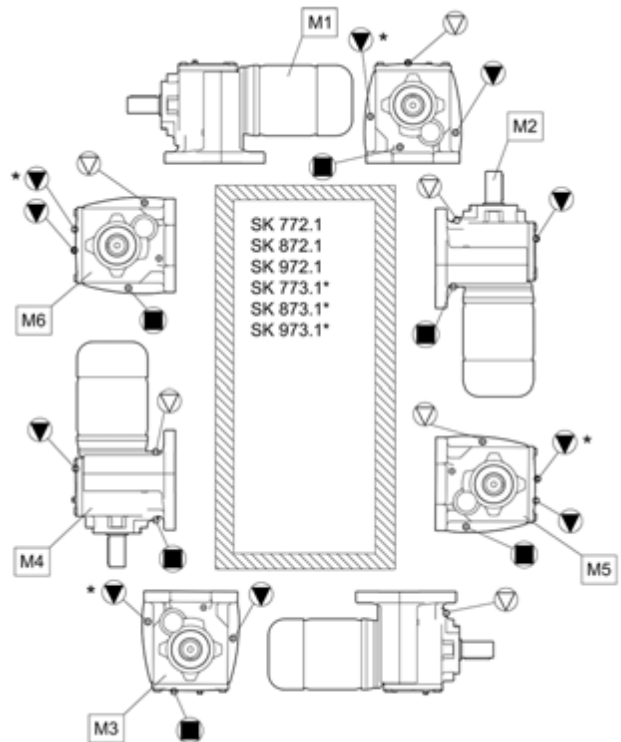
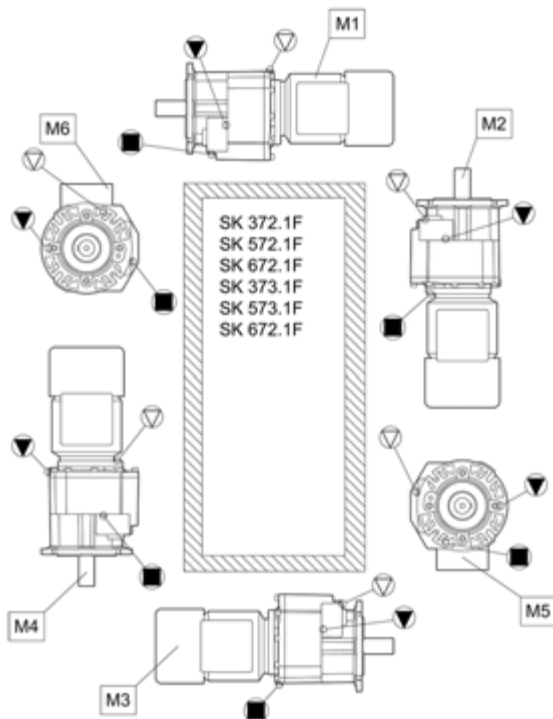
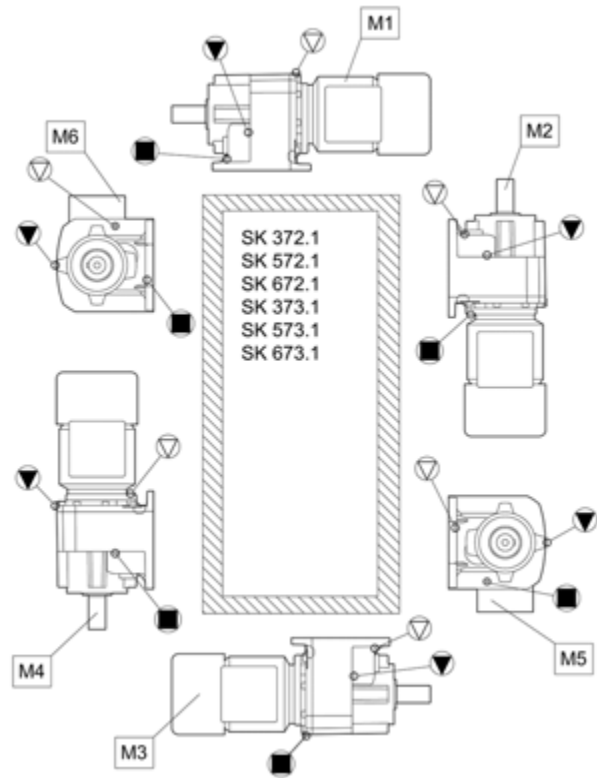
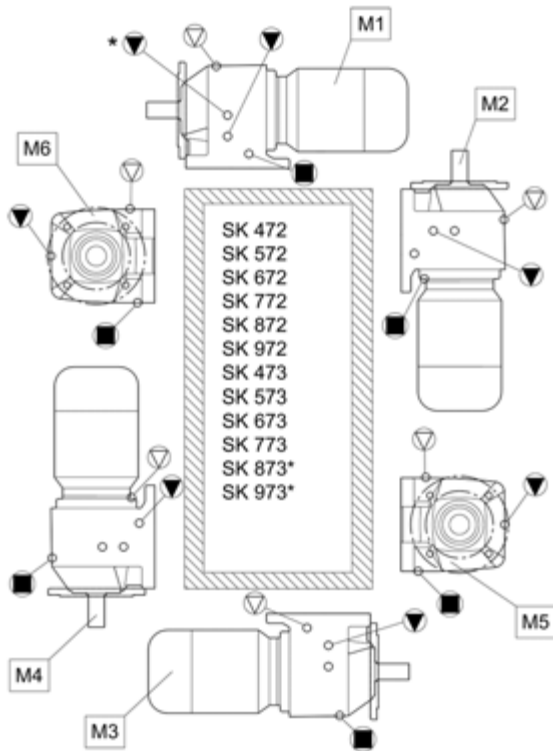
The oil level screws do not apply in ATEX categories 3G and 3D (please see chapter 3.5 "Checking the type plate data"). These gear unit types are lubricated for life.

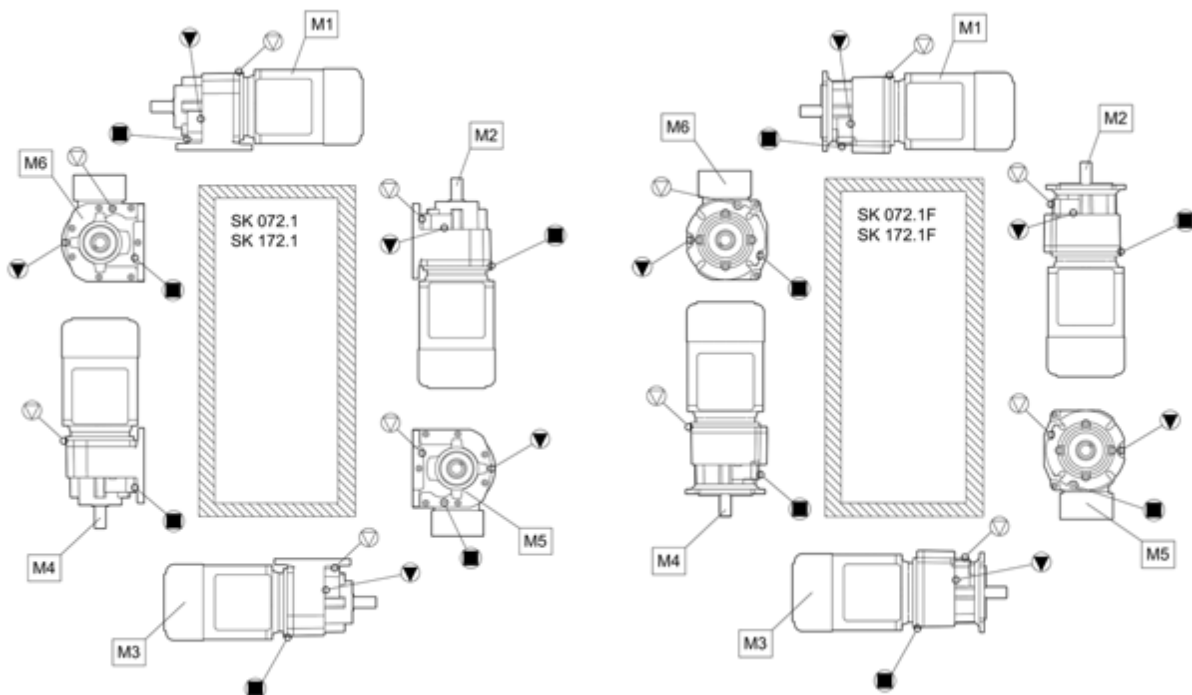
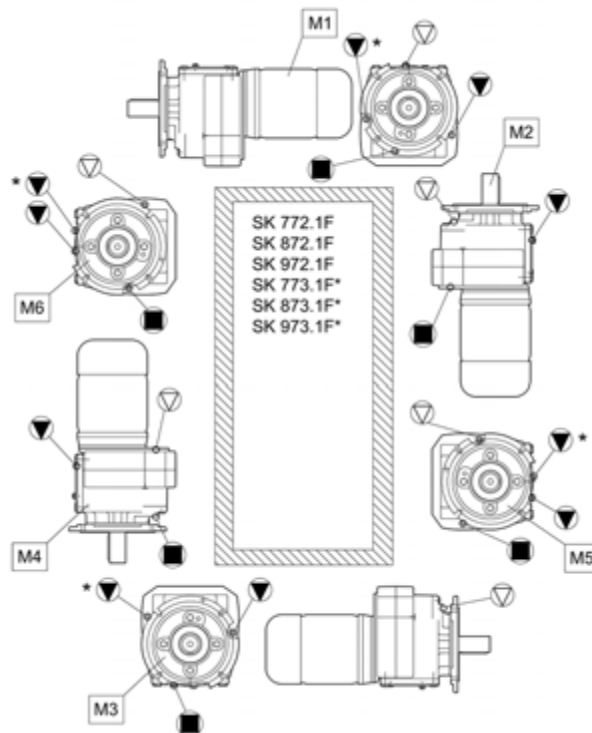
The gear unit types **SK 1S xx**, **SK 2S xx**, **SK 1SU xx**, **SK 2SU xx**, **SK 1SM xx**, **SK 2SM xx**, **SK 1SMI xx**, **SK 2SMI xx** may only be used in category 3G and 3D. These gear unit types are lubricated for life and do not have an oil maintenance screw.

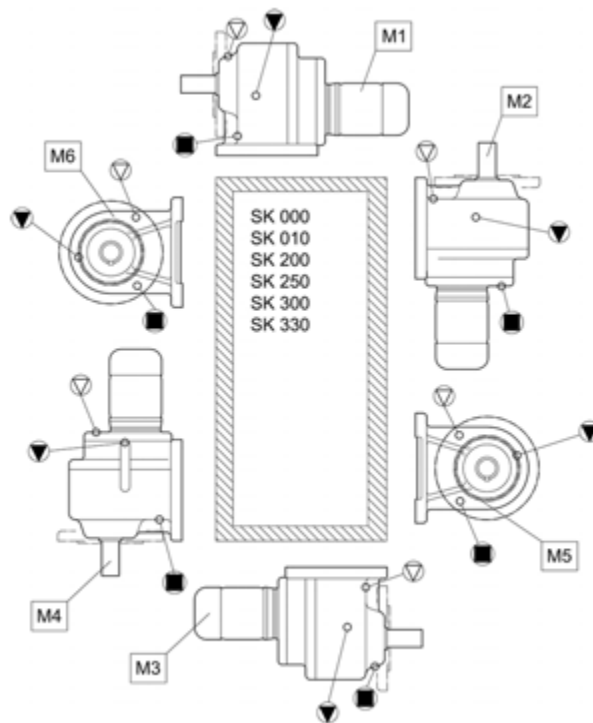
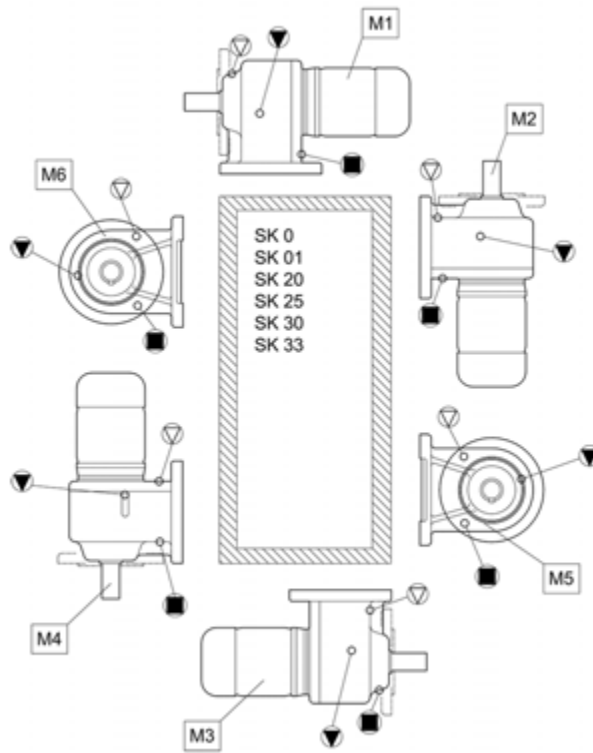
As an option, types SI and SMI can be equipped with a vent screw. Gear units with vents must be installed in the stated position.

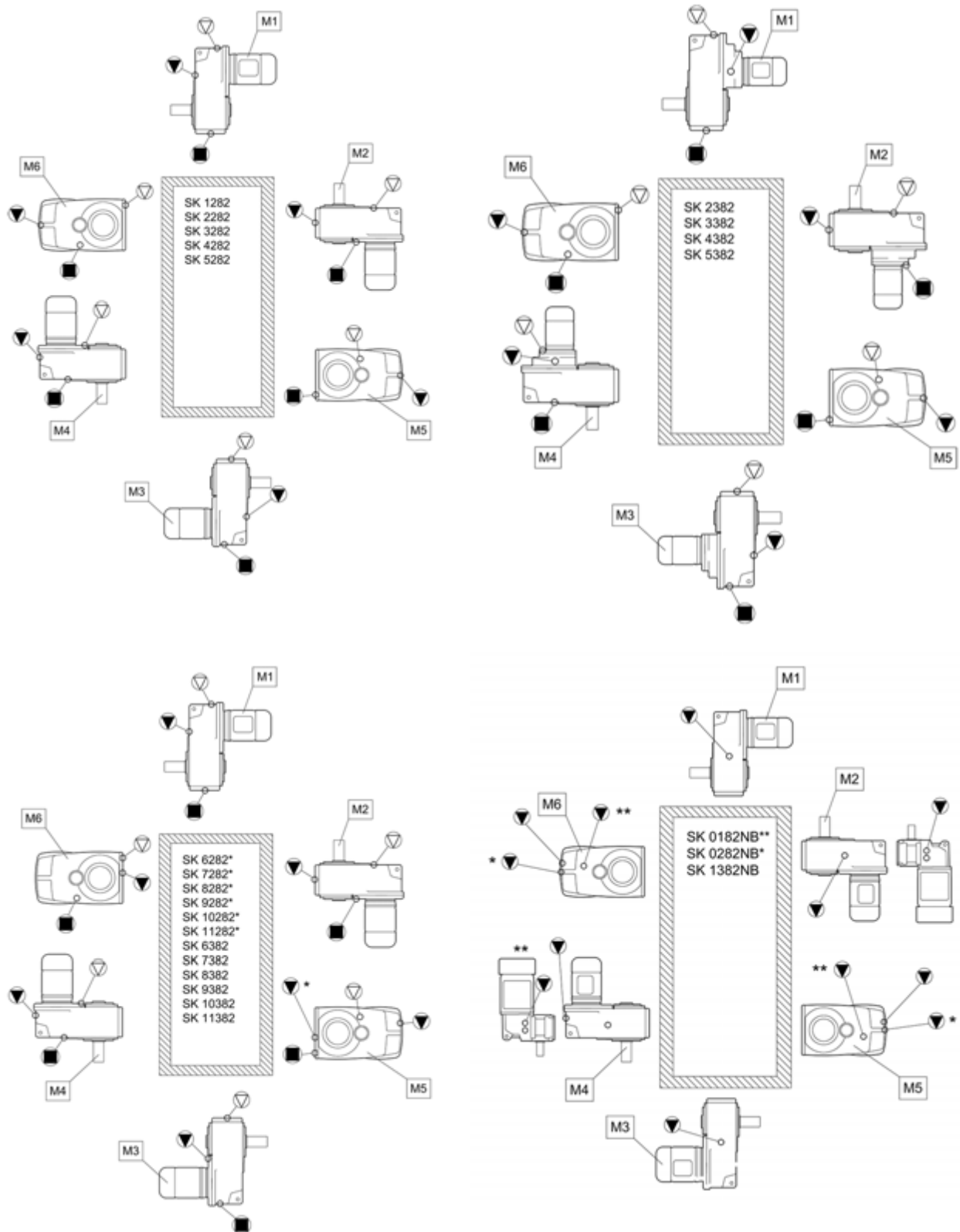
Types SI, SMI, S, SM and SU as 2-stage gear unit types and types SI, SMI as worm gear units for direct motor mounting have an oil filler which depends on the configuration and must be installed in the stated position.

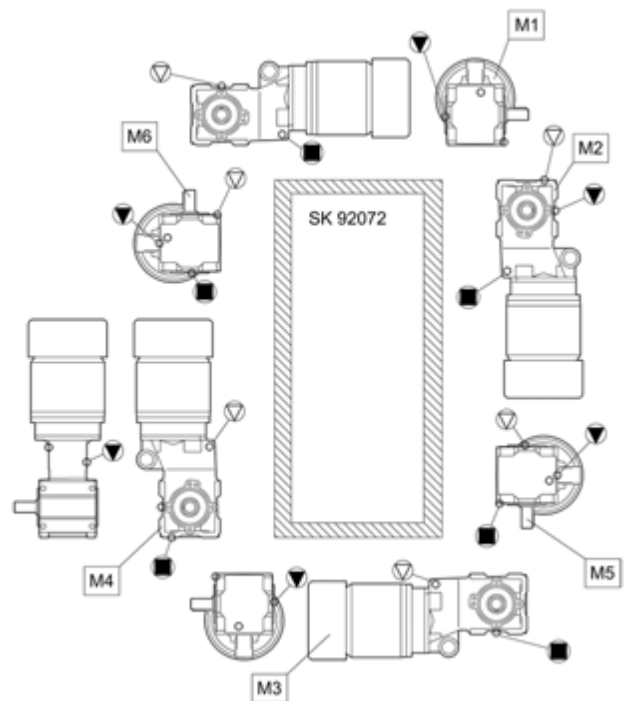
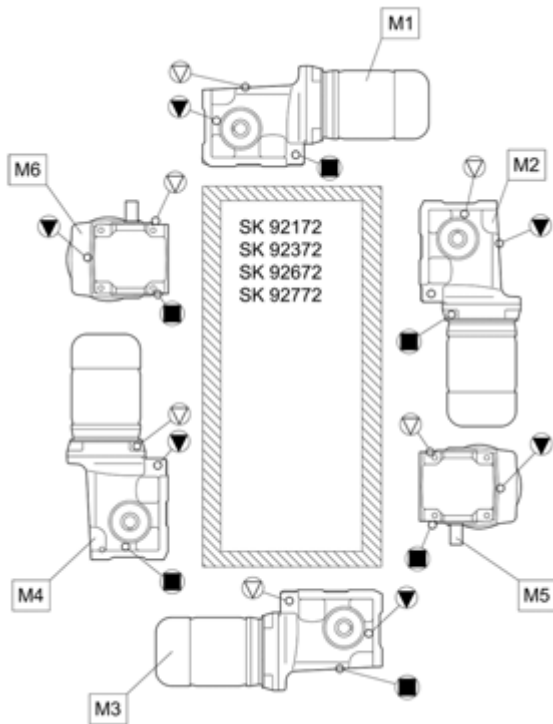
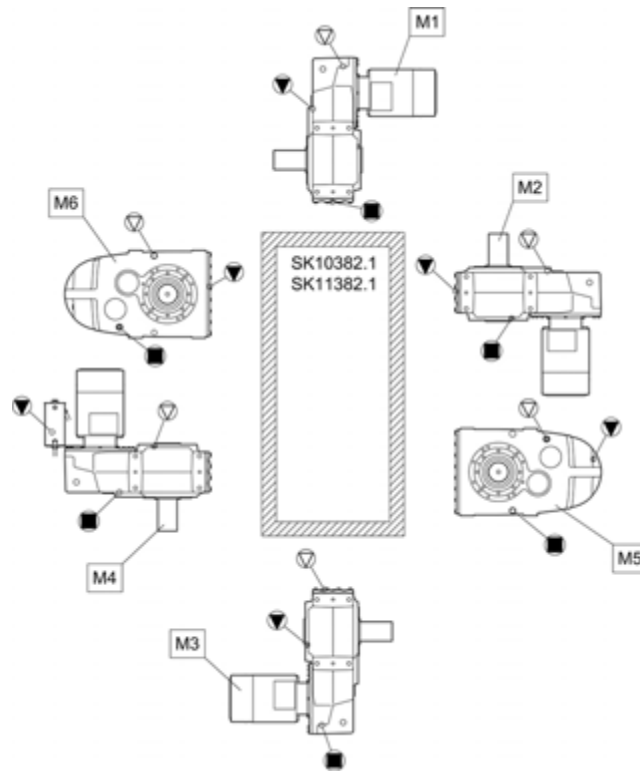


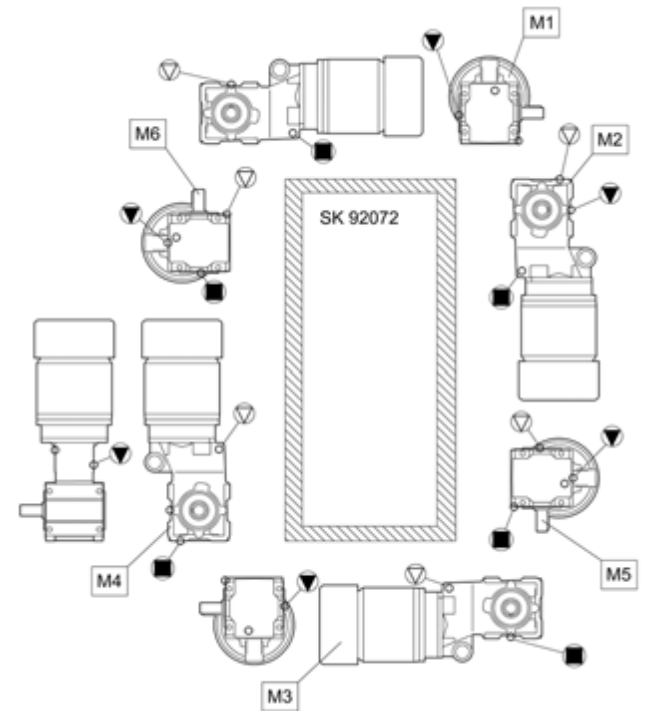
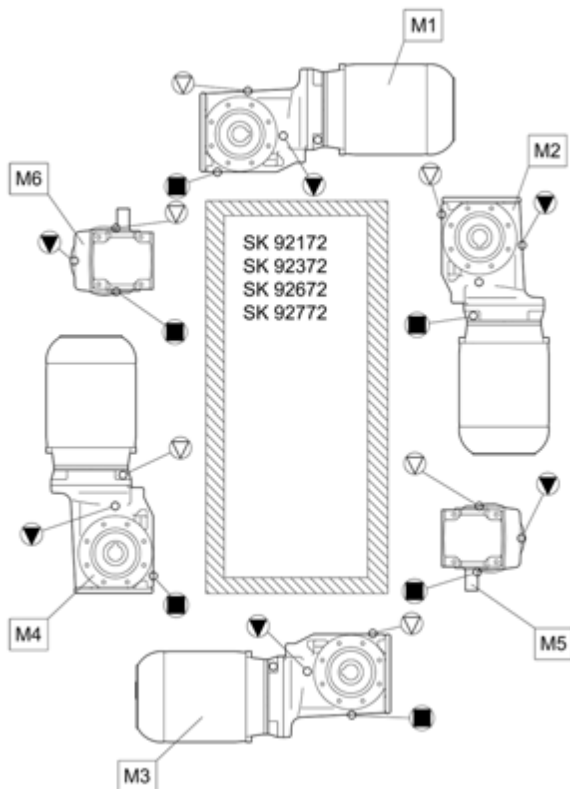
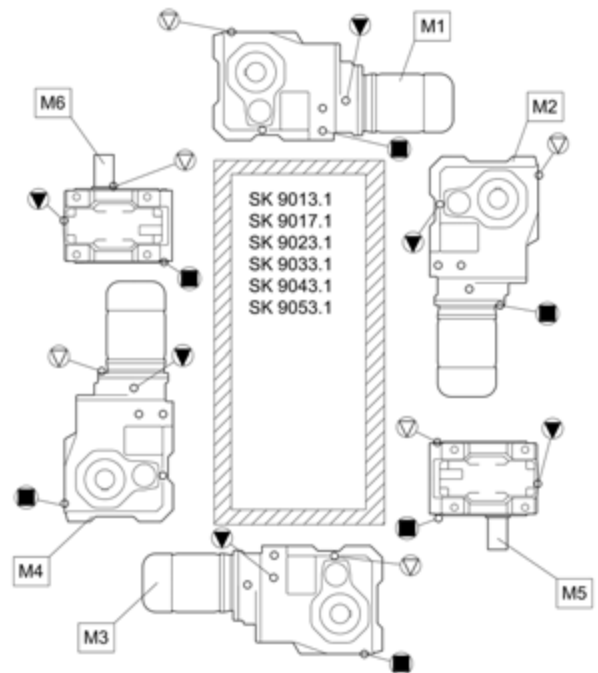
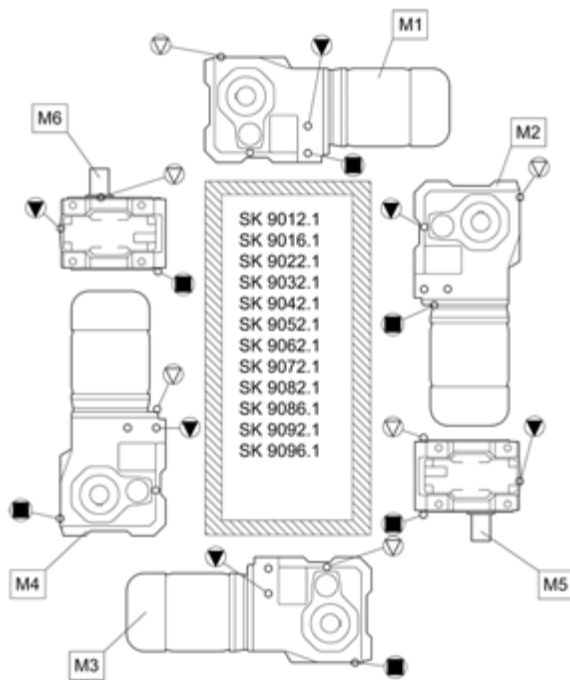


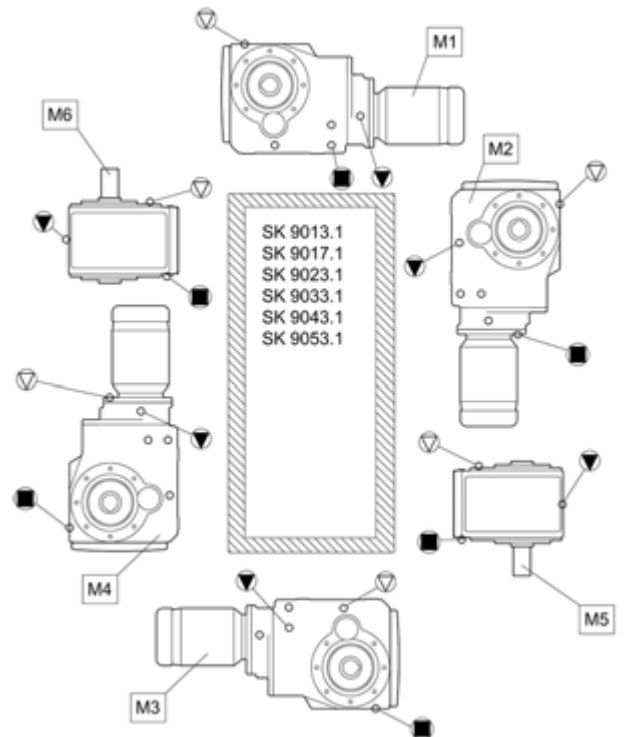
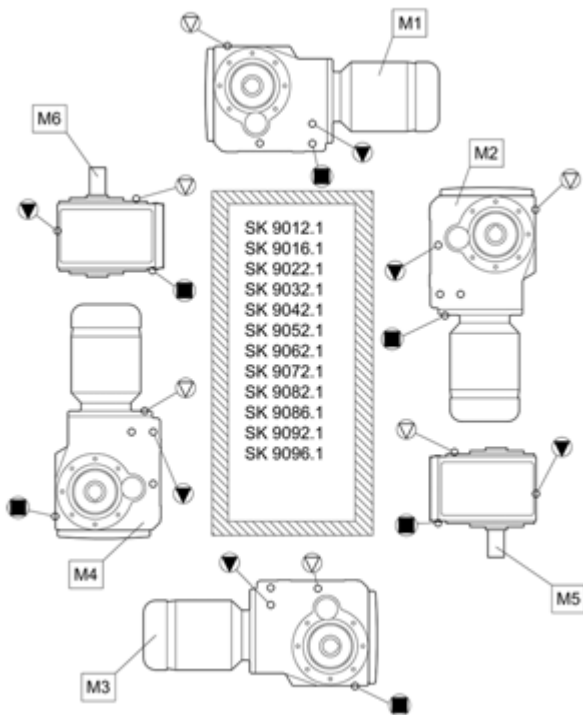
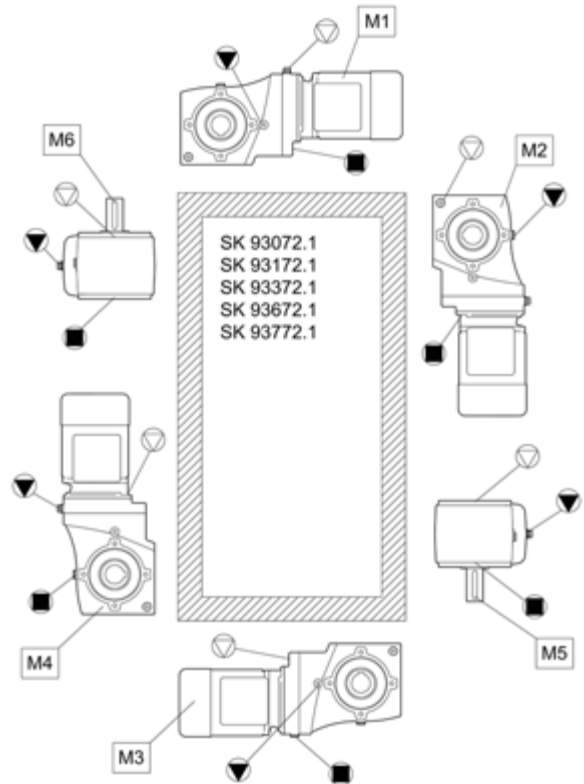
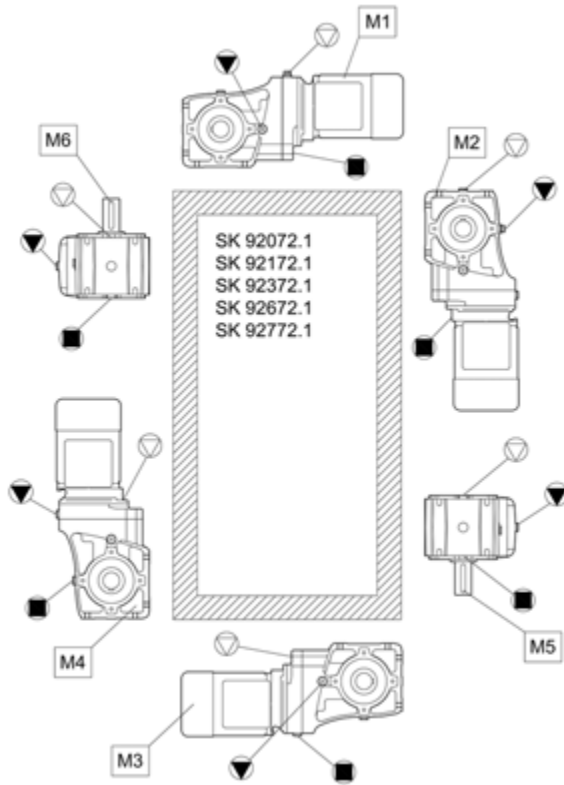


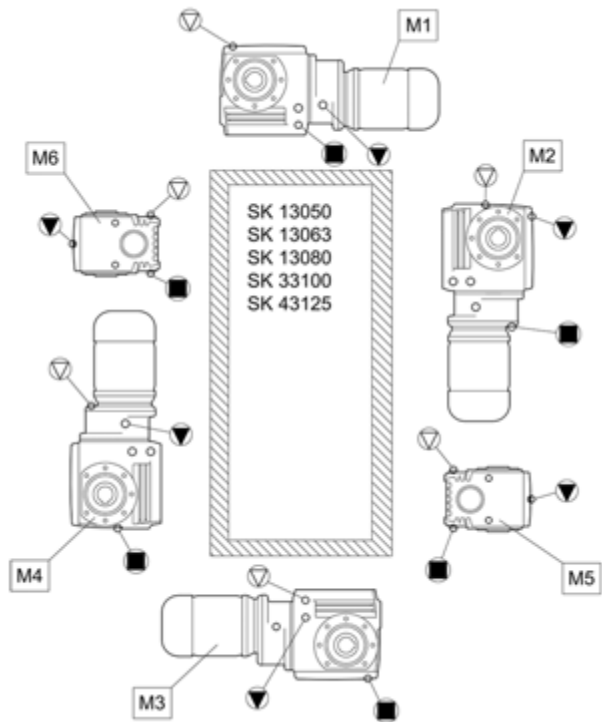
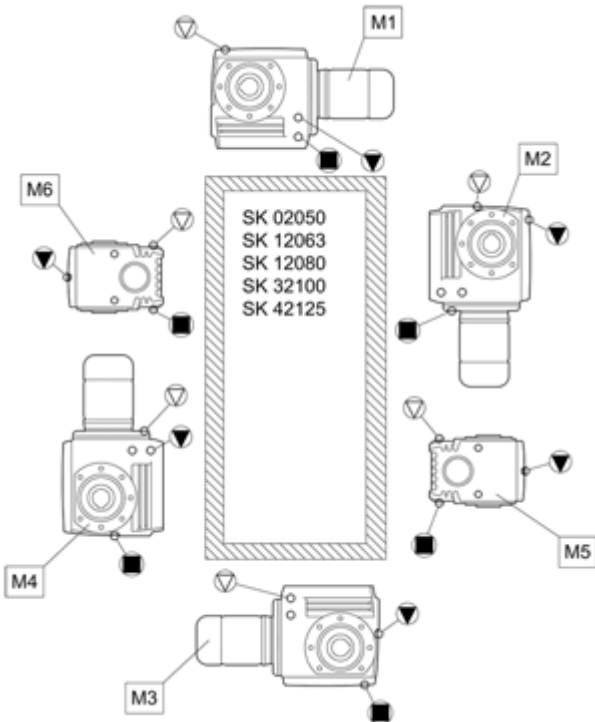
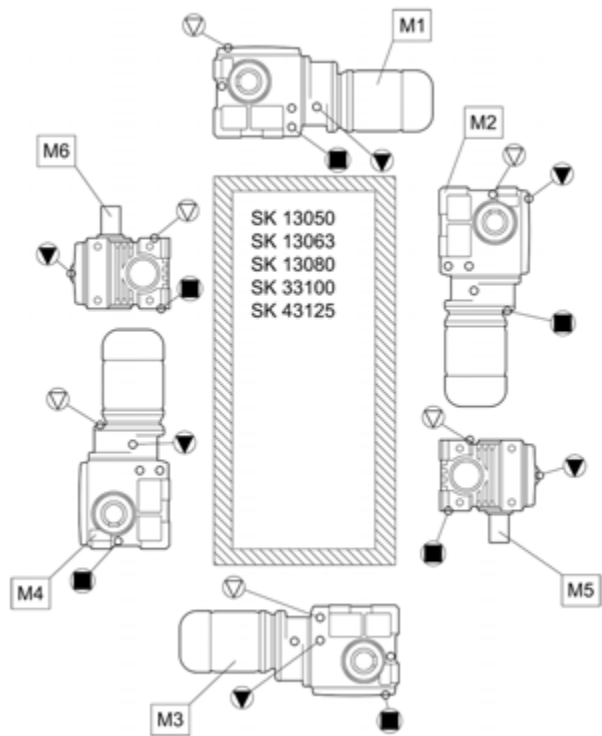
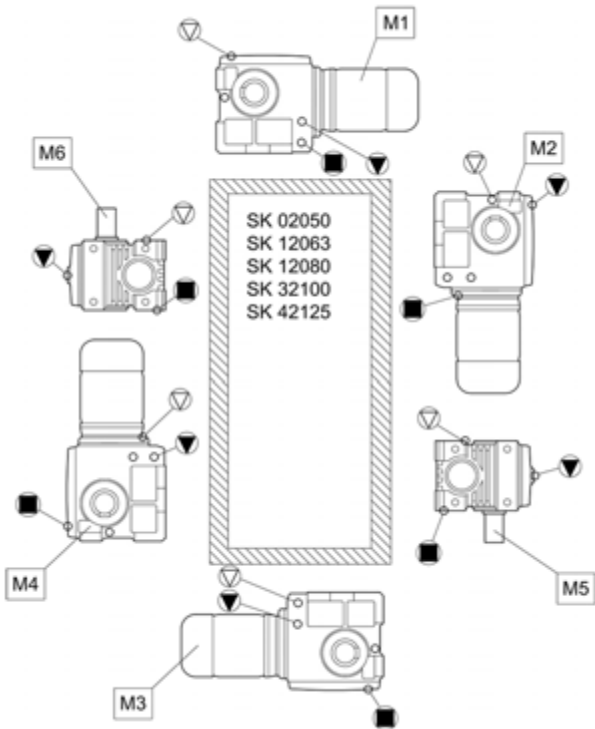


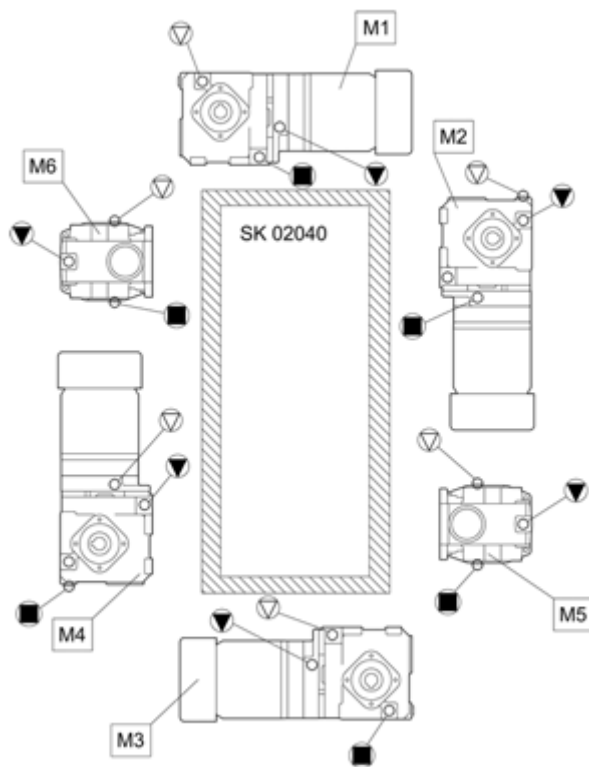
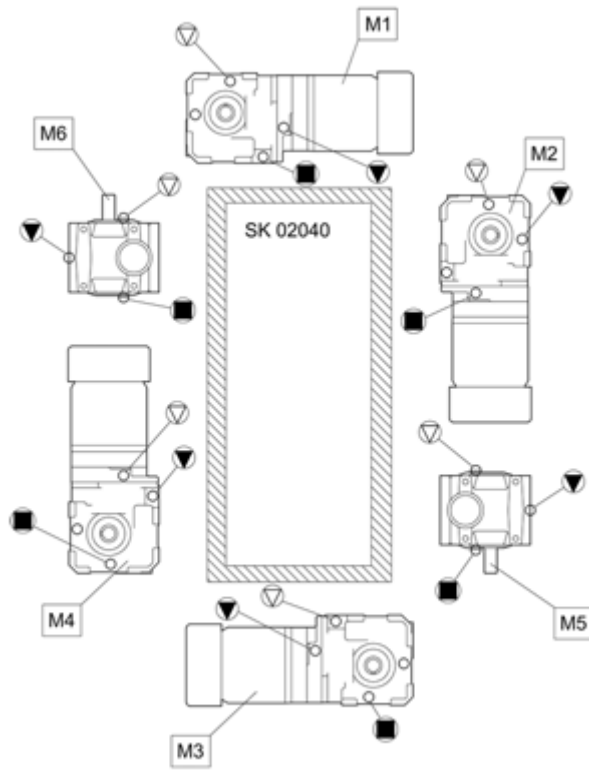


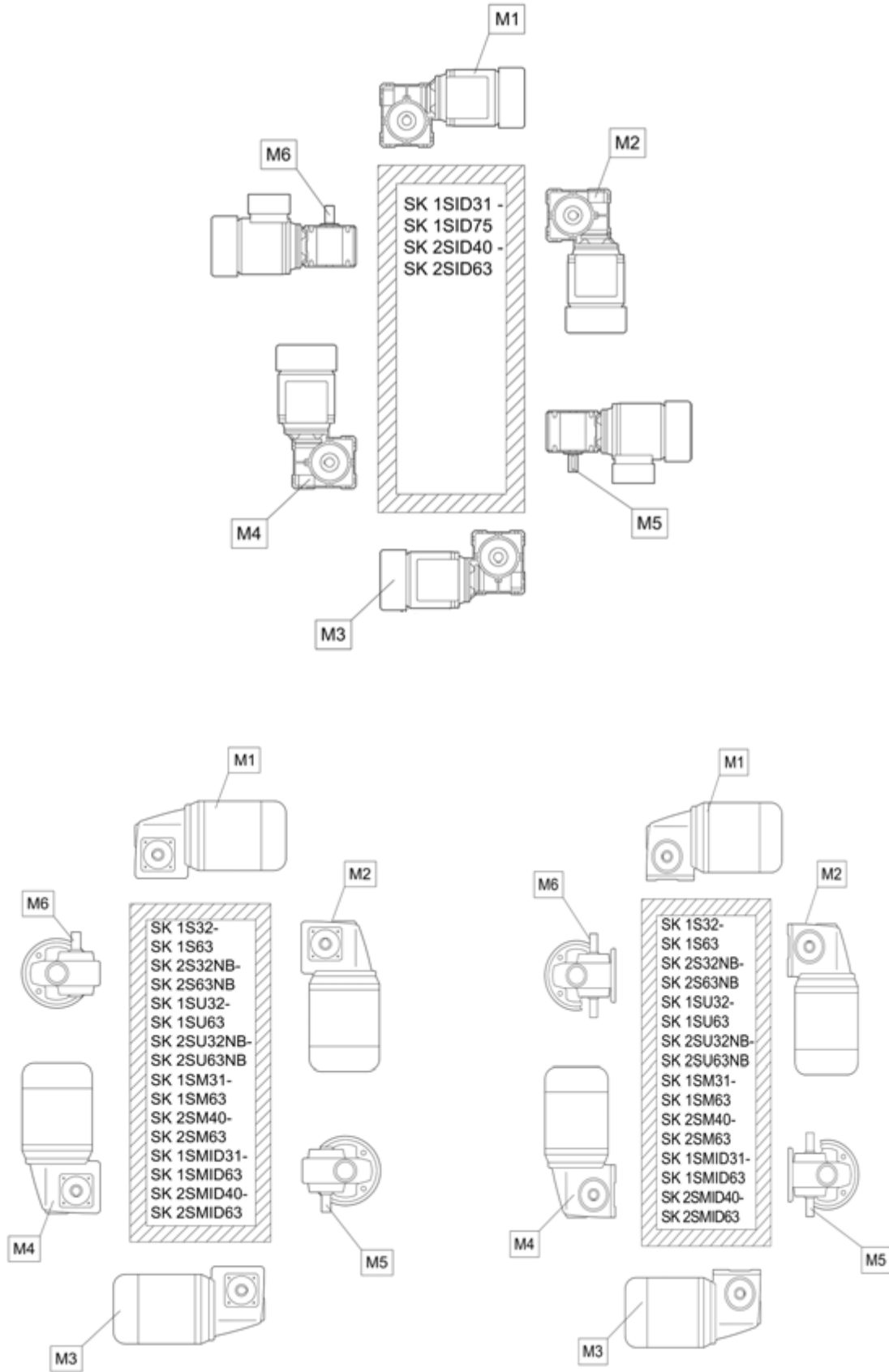












6.2 Lubricants

⚠ DANGER!

Explosion hazard


Explosion hazard. Failure to comply may cause severe, or even fatal injuries.

When changing oil or filling for the first time, the type of lubricant stated on the type plate must be used.

The following table shows the approved proprietary brands or product names according to the gear oil types stated on the type plate (please see chapter 3.5 "Checking the type plate data"). This means that a product corresponding to the type of oil shown on the type plate must be used. In special cases, the designation of the specified product is stated on the type plate of the gear unit.


Lubricant type	Details on type plate					
Mineral oil	CLP 220	Alpha EP 220 Alpha SP 220 Optigear BM 220 Tribol 1100 / 220	Renolin CLP 220 Renolin CLP 220 Plus Renolin GEAR 220 VCI	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220	Omala S2 G 220
	CLP 100	Alpha EP 100 Alpha SP 100 Optigear BM 100 Tribol 1100 / 100	Renolin CLP 100 Renolin CLP 100 Plus	Klüberoil GEM 1-100 N	Mobilgear 600 XP 100	Omala S2 G 100
Synthetic oil (Polyglycol)	CLP PG 680	Alphasyn GS 680 Tribol 800 / 680	Renolin PG 680	Klübersynth GH 6-680	Mobil Glygoyle 680	Omala S4 WE 680
	CLP PG 220	Alphasyn GS 220 Alphasyn PG 220 Tribol 800 / 220	Renolin PG 220	Klübersynth GH 6-220	Mobil Glygoyle 220	Omala S4 WE 220
Synthetic oil (hydrocarbons)	CLP HC 220	Alphasyn EP 220 Tribol 1510/220 Optigear Synthetic X 220	Renolin Unisyn CLP 220 Renolin Unisyn Gear VCI	Klübersynth GEM 4-220 N	Mobil SHC 630	Omala S4 GX 220
Bio-degradable oil	CLP E 680	-	Plantogear 680 S	-	-	-
	CLP E 220	Tribol BioTop 1418 / 220	Plantogear 220 S	Klübersynth GEM 2-220	-	Naturelle Gear Fluid EP 220
Foodstuff compatible oil as per FDA 178.3570	CLP PG H1 680	Tribol FoodProof 1800 / 680	-	Klübersynth UH1 6-680	Mobil Glygoyle 680	Cassida Fluid WG 680
	CLP PG H1 220	Tribol FoodProof 1800 / 220	-	Klübersynth UH1 6-220	Mobil Glygoyle 220	Cassida Fluid WG 220
	CLP HC H1 680	Optileb GT 680	Cassida Fluid GL 680	Klüberoil 4 UH1-680 N		
	CLP HC H1 220	Optileb GT 220	Cassida Fluid GL 220	Klüberoil 4 UH1-220 N	Mobile SHC Cibus 220	

Table 14: Lubricant table

6.3 Torque values

Dimensions	Bolt Torques [Nm]					
	Screw connections in the strength classes			Cover screws	Threaded pin on coupling	Screw connections on protective covers
	8.8	10.9	12.9			
M4	3.2	5	6	-	-	-
M5	6.4	9	11	-	2	-
M6	11	16	19	-	-	6.4
M8	27	39	46	11	10	11
M10	53	78	91	11	17	27
M12	92	135	155	27	40	53
M16	230	335	390	35	-	92
M20	460	660	770	-	-	230
M24	790	1150	1300	80	-	460
M30	1600	2250	2650	170	-	-
M36	2780	3910	4710	-	-	1600
M42	4470	6290	7540	-	-	-
M48	6140	8640	16610	-	-	-
M56	9840	13850	24130	-	-	-
G½	-	-	-	75	-	-
G¾	-	-	-	110	-	-
G1	-	-	-	190	-	-
G1¼	-	-	-	240	-	-
G1½				300		-

Table 15: Torque values

Assembling the hose fittings

Oil the thread of the union nut, the cutting ring and the screw neck. Tighten the union nut with the wrench until the point where the union nut can only be turned with considerably more force. Turn the union nut of the screw fitting approx. 30° to 60° further but not more than 90°. For this the screw neck must be held with a wrench. Remove excess oil from the screw fitting

6.4 Troubleshooting

WARNING

Injury to persons

There is a slipping hazard in case of leaks.

Clean the soiled floor and machine components before starting troubleshooting.

WARNING

Injury to persons

Risk of injury due to rapidly rotating and hot machine components.

Troubleshooting must only be performed when gear units are at a standstill and have cooled down. The drive must be isolated and secured to prevent accidental start-up.

NOTICE

Gear unit damage

Damage to the gear unit is possible in case of faults.

Shut down the drive unit immediately in case of any faults in the gear unit.

Gear unit malfunctions		
Fault	Possible cause	Remedy
Unusual running noises, vibrations	Oil too low or bearing damage or gear wheel damage	Consult NORD Service
Oil escaping from the gear unit or motor	Defective seal	Consult NORD Service
Oil escaping from pressure vent	Incorrect oil level or incorrect, contaminated oil or unfavourable operating conditions	Oil change, use oil expansion tank (Option OA)
Gear unit becomes too hot	Unfavourable installation conditions or gear unit damage	Consult NORD Service
Shock when switching on, vibrations	Defective motor coupling or loose gear unit mounting or defective rubber element	Replace elastomer gear rim, tighten motor and gear unit fastening bolts, replace rubber element
Output shaft does not rotate although motor is running	Fracture in gear unit or defective motor coupling or shrink disc slippage	Consult NORD Service

Table 16: Overview of malfunctions

6.5 Leaks and seals

Gear units are filled with oil or grease to lubricate the moving parts. Seals prevent the escape of lubricants. A complete seal is not technically possible, as a certain film of moisture, for example on the radial shaft sealing rings is normal and advantageous for a long-term seal. In the region of vents, moisture due to oil may be visible due to the escape of oil mist because of the function. In the case of grease-lubricated labyrinth seals, e.g. Taconite sealing systems, used grease emerges from the sealing gap due to the principle of operation. This apparent leak is not a fault.

According to the test conditions as per DIN 3761, the leak is determined by the medium which is to be sealed, which in test bench tests exceeds the function-related moisture in a defined test period and which results in dripping of the medium which is to be sealed. The measured quantity which is then collected is designated as leakage.

Definition of leakage according to DIN 3761 and its appropriate use					
Term	Explanation	Location of leak			
		Shaft sealing ring	in IEC adapter	Housing joint	Venting
Sealed	No moisture apparent	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Damp	Moisture film locally restricted (not an area)	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Wet	Moisture film beyond the extent of the component	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Measurable leakage	Recognisable stream, dripping	Repair recommended	Repair recommended	Repair recommended	Repair recommended
Temporary leakage	Temporary malfunction of the sealing system or oil leak due to transport *)	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Apparent leakage	Apparent leakage, e.g. due to soiling, sealing systems which can be re-lubricated	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint

Table 17: Definition of leaks according to DIN 3761

*) Previous experience has shown that moist or wet radial shaft sealing rings stop leaking later. Therefore, under no circumstances can replacement be recommended at this stage. The reason for momentary moisture may be e.g. small particles under the sealing lip.

6.6 Declaration of Conformity

6.6.1 Explosion protected gear units and geared motors, Category 3G and 3D





GETRIEBEBAU NORD Member of the NORD DRIVESYSTEMS Group	
Getriebebau NORD GmbH & Co. KG <small>Getriebebau-Nord-Str. 1, 22941 Bargteheide, Germany, Tel.: +49(0)4532 289 - 0, Fax: +49(0)4532 289 - 2253, info@nord.com</small>	
EC Declaration of Conformity (up to 19 April 2016) EU Declaration of Conformity (as of 20 April 2016) <small>Within the meaning of EC Directive 94/9/EC Annex VIII (up to 19 April 2016) or within the meaning of the EU Directive 2014/34/EU Annex VIII (as of 20 April 2016)</small>	
Getriebebau NORD GmbH & Co. KG hereby declares that the gear units from the following product series Page 1 of 1	
<ul style="list-style-type: none"> • Helical gear units Type SK ... • Parallel shaft gear units Type SK ...82, SK ..82NB 	<ul style="list-style-type: none"> • Worm gear units Type SK 02..., SK 1Sl.,SK 12..., SK 13..., SK 3..., SK 4.... • Bevel gear units Type SK 9.....
with ATEX labelling  II 2D / 2G	
are compliant with the following directive:	
ATEX directive for products	94/9/EC (up to 19. April 2016) 2014/34/EU (as of 20. April 2016)
Applied standards:	
	EN 1127-1: 2011 EN 13463-1: 2009 EN 13463-5: 2011
In accordance with 94/9/EC Annex VIII (up to 19 April 2016) or in accordance with 2014/34/EU Annex VIII (as of 20 April 2016) Getriebebau NORD has deposited the required documents with the body stated below:	
	DEKRA EXAM GmbH Dinnendahlstraße 9 44809 Bochum ID number: 0158 Certificate: BVS 04 ATEX H/B 196
Bargteheide, 16.02. 2016  U. Küchenmeister Manager	 Dr. O.Sadi Technical Manager

Fig. 31: Declaration of Conformity for Category 2G / 2D

6.6.2 Explosion protected gear units and geared motors, Category 3G and 3D









<p>GETRIEBEBAU NORD Member of the NORD DRIVESYSTEMS Group</p>									
<p>Getriebebau NORD GmbH & Co. KG Getriebebau-Nord-Str. 1 · 22941 Bargteheide, Germany · Tel.: +49(0)4532 289 - 0 · Fax: +49(0)4532 289 - 2253 · info@nord.com</p>									
<p>EC Declaration of Conformity (up to 19 April 2016) EU Declaration of Conformity (as of 20 April 2016) Within the meaning of EC Directive 94/9/EC Annex VIII (up to 19 April 2016) or within the meaning of the EU Directive 2014/34/EU Annex VIII (as of 20 April 2016)</p>									
<p>Getriebebau NORD GmbH & Co. KG hereby declares that the gear units from the following product series Page 1 of 1</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Helical gear units Type SK ... • Parallel shaft gear units Type SK ...82, SK ..82NB </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • Worm gear units Type SK 02..., SK 1SI...,SK 12..., SK 13..., SK 3..., SK 4.... • Bevel gear units Type SK 9..... </td> </tr> </table> <p>with ATEX labelling  II 3D / 3G</p> <p>are compliant with the following directive:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">ATEX directive for products</td> <td style="width: 50%;">94/9/EC (up to 19. April 2016) 2014/34/EU (as of 20. April 2016)</td> </tr> </table> <p>Applied standards:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">EN 1127-1:</td> <td style="width: 50%;">2011</td> </tr> <tr> <td>EN 13463-1:</td> <td>2009</td> </tr> </table>		<ul style="list-style-type: none"> • Helical gear units Type SK ... • Parallel shaft gear units Type SK ...82, SK ..82NB 	<ul style="list-style-type: none"> • Worm gear units Type SK 02..., SK 1SI...,SK 12..., SK 13..., SK 3..., SK 4.... • Bevel gear units Type SK 9..... 	ATEX directive for products	94/9/EC (up to 19. April 2016) 2014/34/EU (as of 20. April 2016)	EN 1127-1:	2011	EN 13463-1:	2009
<ul style="list-style-type: none"> • Helical gear units Type SK ... • Parallel shaft gear units Type SK ...82, SK ..82NB 	<ul style="list-style-type: none"> • Worm gear units Type SK 02..., SK 1SI...,SK 12..., SK 13..., SK 3..., SK 4.... • Bevel gear units Type SK 9..... 								
ATEX directive for products	94/9/EC (up to 19. April 2016) 2014/34/EU (as of 20. April 2016)								
EN 1127-1:	2011								
EN 13463-1:	2009								
<p>Bargteheide, 16.02.2016</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">  U. Küchenmeister Manager </td> <td style="width: 50%; text-align: center;">  Dr. O.Sadi Technical Manager </td> </tr> </table>		 U. Küchenmeister Manager	 Dr. O.Sadi Technical Manager						
 U. Küchenmeister Manager	 Dr. O.Sadi Technical Manager								

Fig. 32: Declaration of Conformity for Category 3G / 3D

6.7 Repair information

For enquiries to our technical and mechanical service departments, please have the precise gear unit type (type plate) and if necessary the order number (type plate) to hand.

6.7.1 Repairs

The device must be sent to the following address if it needs repairing:

Getriebebau NORD GmbH & Co. KG
Service Department
 Getriebebau-Nord-Straße 1
 22941 Bargteheide

No guarantee can be given for any attachments, such as encoders or external fans, if a gear unit or geared motor is sent for repair.

Please remove all non-original parts from the gear unit or geared motor.

i Information	Reason for return
If possible, the reason for returning the component or device should be stated. If necessary, at least one contact should be stated in case of queries.	
This is important in order to keep repair times as short and efficient as possible.	

6.7.2 Internet information

In addition, the country-specific operating and installation instructions in the available languages can be found on our Internet site: www.nord.com


6.8 Abbreviations

2D	Dust explosion protected gear units zone 21	FA	Axial force
2G	Explosion protected gear units with ignition protection class "c"	IE1	Motors with standard efficiency
3D	Dust explosion protected gear units zone 22	IE2	Motors with high efficiency
ATEX	AT mospheres EX plosibles	IEC	International Electrotechnical Commission
B5	Flange fastening with through holes	NEMA	National Electrical Manufacturers Association
B14	Flange fastening with threaded holes	IP55	International Protection
CW	Clockwise, right-hand direction of rotation	ISO	International Standardisation Organisation
CCW	Counter-clockwise, left-hand direction of rotation	pH	pH value
°dH	Water hardness in German hardness degrees: 1°dH = 0.1783 mmol/l	PPE	Personal Protective Equipment
DIN	German standards institute	RL	Directive
EC	European Community	VCI	Volatile Corrosion Inhibitor
EN	European standard	WN	Getriebebau NORD factory standard
FR	Radial transverse force		

Key word index

A		Introduction of forces	28
Activating the vent	26	L	
Address.....	81	Leakage	78
Assembly	25	Long-term storage.....	20
C		Lubricant sensor	43
Check the oil level	41	Lubricants	75
Coolant	46	M	
Cooling cover.....	38	Maintenance	81
Correct use	9	Check oil level	52
Coupling wear limits	54	Cooling coil.....	57
Covers	35	Coupling	53
D		Hose	52
Danger labels	9	Leaks.....	51
Data on the type plate	22	Lubricant dispenser.....	55
Disposal of materials	12	Oil change	56
F		Pressure vent	55
Faults.....	77	Re-greasing VL2, VL3 and IEC.....	54
G		Rubber buffers.....	52
Gear unit types	13	Running noises.....	51
Bevel gear units	16	Shaft sealing ring.....	57
Double gear units.....	18	Temperature sticker	52
Helical gear units	13	Maintenance intervals.....	49
Helical worm gear units.....	17	Motor weights for IEC adapters	36
MINIBLOC.....	17	O	
NORDBLOC helical gear units	14	Oil fill volumes for standard helical gear units	57
Parallel shaft gear units	15	Option H66.....	30
Standard helical gear units	14	P	
UNIVERSAL worm gear units.....	18	Pulling devices	28
General overhaul	58	Push-on gear unit.....	30
General safety information	10	R	
H		Repairs.....	81
Hose fitting.....	76	S	
I		Safety information	2
Inspection intervals.....	49	Service	81
Installing the gear unit	26	Shrink disc	33
Internet.....	81	Standard motor	36

Storage	20	Tightening torques	76
T		Transport.....	19
Temperature sticker.....	39	V	
Test run.....	46	Version testing	24



NORD DRIVESYSTEMS Group

Headquarters and Technology Center
in Bargteheide close to Hamburg, Germany

Innovative drive solutions
for more than 100 branches of industries

Mechanical products
Parallel shaft-, helical gear-, bevel gear- and worm gear units

Electrical products
IE2/IE3/IE4-Motors

Electronic products
Centralized and decentralized frequency inverters
and motor starters

7 state-of-the-art production plants
for all drive components

Subsidiaries in 36 countries on 5 continents
providing local stock, assembly, production,
technical support and customer service.

More than 3,200 employees around the world
providing application-specific solutions for our customers.

www.nord.com/locator

Headquarters:

Getriebebau NORD GmbH & Co. KG

Getriebebau-Nord-Straße 1

22941 Bargteheide, Germany

Fon +49 (0) 4532 / 289-0

Fax +49 (0) 4532 / 289-2253

info@nord.com, www.nord.com

Member of the NORD DRIVESYSTEMS Group

